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PRESENT-DAY THEORIES OF THE CAUSE OF DENTAL CARIES*

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Dental caries is a disease that is widespread among people all over the world, in the urban as well as the rural population, except in a few scattered areas. It is found among the young and the old, but especially in the young. The wealthy are afflicted to as great an extent as the poor, those who are healthy and those who do not have good health. As a disease it has certain unique characteristics that make it difficult to control. Its progress among humanity at large entails an enormous economic burden, frequently causes much suffering and secondary illness, and often interferes seriously with nutrition. It is generally believed that the disease is increasing.

Because 80 to 95 per cent of children between the ages of ten and twenty are afflicted with this disease, an earnest effort is being made to learn something about its cause and to devise practical methods for its prevention, as well as to provide early dental care for cavities that develop.

We must recognize certain handicaps to the solution of the problem of the etiology of dental caries. In the first place, there is no experimental animal, such as the carefully standardized white rat, that is convenient as well as suitable to use in such investigations. Many unavoidable variable factors enter into even the best planned human experiment.

* Presented to the American Dietetic Association, Cincinnati, Ohio, October, 1931.

** In charge of the nutrition problems in the researches into the etiology of dental caries being conducted at the University of Michigan under the direction of Dr. R. W. Bunting. This research project is being financed through the University by the Children's Fund of Michigan.

In the second place, there has been a discouraging lack of coöperation among those engaged in studying the problem. Biochemists, nutritionists, bacteriologists and physicians, well trained in the fundamental sciences and in research methods, have engaged in researches in this field with no experience in diagnosing mouth diseases and without enlisting the coöperation of interested dentists. Many of the unique characteristics of the various forms of oral pathology are apparent only to one thoroughly familiar with them through years of experience. On the other hand, few dentists have an adequate scientific background and few have had the foresight and financial opportunity to secure, for their research, the assistance of those who are so equipped. Demonstrations have been classed as researches. Methods have been used that cannot be accepted by the trained research person. Dentists in general have been too ready to accept conclusions of a biochemical and nutritional nature that are published, without regard to the value of the methods used in arriving at such conclusions.

It is encouraging to know that, during the past two or three years, several centers have been organized whose personnel is made up of persons trained along all related lines.

An effort has been made in this review to bring together the various theories that are being advocated by dental research workers and others, as having some rôle in the etiology of tooth decay, giving a brief discussion of each in the light of present knowledge. Omissions will have to be made, for it will be impossible to discuss the work of everyone who has published reports of investigations or who has acquired a reputation among many dentists for some remarkable preventive measure, even to the filling up of cavities by the adoption of a given diet! It is hoped that enough can be given to clarify the scientific principles involved and to help in the development of a more critical attitude toward publications in this field.

RELATION OF VARIOUS NUTRITIONAL FACTORS TO TOOTH STRUCTURE AND ARRANGEMENT AND THE BEARING THIS HAS ON SUSCEPTIBILITY TO CARIES

There seems to be no disagreement with the statement that serious nutritional disturbances lasting over a period of time, occurring at ages when the crowns of teeth are being formed (table 1), will usually result in imperfect enamel formation as long as the disorder lasts. Everyone is familiar with the horizontal, bilaterally symmetrical blemishes often found in enamel. Dentists can tell at what age the person concerned

had a serious illness and its approximate duration. Malformation of bone in childhood, or the too early removal of deciduous teeth may mean jaw bones that are too small to hold the permanent teeth, with resultant overcrowding and malocclusion.

Hess and Abramson have submitted evidence that infantile scurvy occurring in a group of children under their supervision had no effect on the structure of their permanent teeth and bore no relation to their subsequent susceptibility to caries. They state that scurvy in infancy did not even lead to delay in eruption of the deciduous teeth.

TABLE 1

Age when enamel begins to form on the teeth, and average age when the teeth erupt

	DECIDUOUS TEETH		PERMANENT TEETH	
	Age when crown begins	Age when tooth erupts	Age when crown begins	Age when tooth erupts
Central incisors:				
Lower	17–18th week of embryonic life	7 mos.		7 yrs.
Upper		9 mos.		8 yrs.
Lateral incisors.				
Lower		12 mos.		
Upper		9 mos.		
First molars		14 mos.	25th embryonic week	6 yrs.
Cuspids		18 mos.		
First premolars			4 yrs.	9 yrs.
Second premolars			4 yrs.	10 yrs.
Canines			3 yrs.	11 yrs.
Second molars	18th embryonic week	26 mos.	5 yrs.	12 yrs.
Third molars			9 yrs.	18–25 yrs.

Bunting, R. W.: Oral Pathology. Lea and Febiger, Philadelphia. 1929.

Bloch has recently reported a follow-up study of a group of sixty-four children, twelve years or more in age, living in a Danish home for the blind. He states that all of these children became blind due to lack of vitamin A, most of them developing xerophthalmia between three months and twelve months of age, the others between one and two years. Nineteen of them showed manifestations of early rickets and in these one or more groups of teeth were definitely hypoplastic. The structure of the teeth in the rest of the children was usually normal, with only slight defects in the six year molars, changes quite common in children generally.

He concludes that vitamin A deficiency, *per se*, has no effect on tooth structure and bears no relation to susceptibility to caries.

McCollum (1931) reviews some work carried out by Klein under his supervision, in which it was demonstrated that tooth structure of pigs could be influenced by feeding the sow a rickets-producing diet, but that much more serious changes could be induced by giving this diet directly to the young after weaning. The abnormalities noted were hypoplastic enamel, open apices, very large pulp chambers, and malocclusion. Withdrawal of vitamin C had no such effect.

Mrs. Mellanby (1930) and Toverud and Toverud (1931) have demonstrated the rôle of vitamin D and calcium and phosphorus metabolism in the formation of sound teeth in pups. Mrs. Mellanby presents evidence that hypoplastic teeth of children are somewhat more susceptible to decay than are sound teeth (table 2). Without doubt they disintegrate more rapidly after caries once starts. She could not produce caries experimentally in pups, however, regardless of their tooth structure.

Mrs. Mellanby claims that the same factors that cause poor enamel formation will, if they prevail after a tooth is erupted and regardless of whether it is hypoplastic or well formed, lead to its disintegration, due to the fact that the secondary dentine, in her opinion, is continuously dependent on diet. The development of faulty structure in this dentine lessens the resistance of the enamel to the acid produced on the surface of the tooth by bacteria. The converse is also true, she claims. A tooth that is poorly formed when erupted may, if faults in diet are corrected, develop a secondary dentine of such a nature as to make the tooth highly resistant to caries. (This theory does not explain her inability to produce caries in dogs.)

Under Mrs. Mellanby's supervision demonstrations have been conducted on children living in certain institutions, in which she believes she has caused a decrease in incidence of caries through variations in vitamin D intake and in lessening the oatmeal consumed, since she regards oatmeal as hindering normal calcium utilization. Table 3 is a summary of her first ventures in this field. More recently the Committee on Dental Research of the Medical Research Council, London, has reported further demonstrations of this nature.

In opposition to these views, there have recently been submitted the following pieces of evidence:

Hess and Abramson made a careful follow-up study of children who had formerly been in the Hebrew Infant Asylum or had been subjects

of personal study elsewhere. Some of these children had had rickets of varying degrees of severity in infancy, others had never had any manifestations of this disease, due to adequate vitamin D intake. At the

TABLE 2

Relation between structure and type of deciduous teeth and their susceptibility to caries

	NUMBER OF TEETH	NORMAL OR SLIGHT HYPOPLASIA				MODERATE OR SEVERE HYPOPLASIA			
		Caries, slight or none		Caries, moderate or severe		Caries, slight or none		Caries, moderate or severe	
		Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent
Incisors	236	172	72.9	30	12.7	15	6.36	19	8.05
Cuspids	156	56	35.9	15	9.6	29	18.6	56	35.9
First molars	249	31	12.5	36	14.5	14	5.6	168	67.5
Second molars	395	11	2.8	21	5.3	40	10.1	323	81.7
Totals	1,036	270	26.0	102	9.84	98	9.46	566	54.63

Mellanby, M.: J. Amer. Dent. Assoc. 17: 1456, 1930.

TABLE 3

Study of effect of varying amounts of vitamins A and D and of oatmeal on incidence of dental caries in children living in an institution

(Average age of children under six years)

	GROUP A	GROUP B	GROUP C	GROUP D
Special additions to institutional diet:				
Milk	1,000 cc.	500 cc.	700 cc.	700 cc.
Egg	45 gm.	6 gm.	14 gm.	14 gm.
Oatmeal	0	51 gm.	0	0
Cod liver oil	21 gm.	0	10.5 gm.	0
Olive oil	0	21 gm.	10.5 gm.	0
Irradiated ergosterol	0	0	0	Much
Number of children in each group	21	18	19	20
Increased incidence of dental caries, number of carious teeth per child	1.4	5.0	3.3	1.0
Arrested caries, number of unextended cavities per child	3.7	0.2	1.2	3.9
Salivary calcium		High	Low	Low

Mellanby, M.: J. Amer. Dent. Assoc. 17: 1456, 1930.
Mellanby, E.: J. Amer. Med. Assoc. 96: 325, 1931.

time of the follow-up study reported, the children ranged in age from three to nine years. The conclusion arrived at by the authors was that there is no constant parallelism between rickets in infancy and subsequent

immunity or susceptibility to caries. They also remind us that there are parts of the world with almost perpetual sunshine, where rickets is unknown, yet where caries is rampant. Hess and Abramson believe that rickets is only one of several factors related to tooth decay, and that caries cannot be regarded as merely a manifestation of rickets and vitamin D deficiency.

Hoppert, Webber, and Canniff recently produced evidence, from a long series of experiments on rats, which they believe indicates that the structure of teeth has nothing to do with the development of caries. They even go so far as to state that neither the chemical nor the nutritional make-up of the diet is of any significance. Their observations were that it is only when coarse particles of carbohydrate food lodge between the teeth and remain there for a long time that caries develops. They believe that caries is caused by acid fermentation of these food particles by aciduric organisms. If poorly formed and poorly arranged teeth offer greater opportunity for food impaction, then the last named authors would concede greater susceptibility. They would not be willing to support the claim that the condition of secondary dentine is a determining factor deserving serious consideration.

Finally, it is a common observation that many people with apparently perfectly formed teeth, having normal occlusion, are very susceptible to caries, while some persons, who have never had any enamel on their permanent teeth, have grown to adult age with no cavities. Why is this?

FAULTS IN ORAL HYGIENE IN RELATION TO THE CAUSE OF TOOTH DECAY

The assertion "A clean tooth never decays" has long since been discarded by serious students of dental disease. Some people who keep their teeth apparently scrupulously clean, even though not bacteriologically clean, have many cavities while others with visibly dirty mouths remain free from caries. Reports by Bunting and colleagues (1930), and by Jay and Esser (1930) show also that mouth washes are not a dependable protection against this disease.

Sim Wallace was the leading advocate of efficient chewing of hard food as a protection against caries. Today we are inclined to believe that the *stimulation* of mastication is of direct value to gum tissue only. Wallace and Pickerill both advocated ending a meal with hard raw fruit or vegetable that would automatically cleanse the teeth of all sticky carbohydrate. Proponents of the infectious theory of the cause of tooth decay would favor the principle underlying this recommended practice.

A thorough clean-up of the mouth followed by the filling of all cavities,

frequently checks, for a varying period of time, the development of new cavities, but is not a guarantee that no more will form.

HEREDITY

Many observations seem to support the theory that good or bad teeth are inherited. There are, however, so many variables affecting growth and development of various body tissues that this thesis would be hard to prove or disprove. On reference to table 4, however, attention is called to groups 1, 2, and 4, in contrast with groups 3 and 5. Children included in groups 1, 2, and 4 all live in orphanages, as do those in group 5. Group 3 is composed of children attending a consolidated rural public school. If heredity is really a *controlling* factor, it is hard to conceive

TABLE 4

Comparison of value of improving the diet and of the use of an antiseptic mouth wash in decreasing the incidence of dental caries in various orphanages

TYPE OF TREATMENT	NUMBER IN EACH GROUP	NO ACTIVE CARIES		ACTIVE CARIES		SMALL OR QUESTIONABLE CARIES	
		Number	Per cent	Number	Per cent	Number	Per cent
Improved diet and mouth wash (1 year)	156	125	80.0	8	5.0	23	15.0
	118	93	79.0	7	6.0	18	15.0
Mouth wash only (9 months)	104	26	25.0	52	50.0	26	25.0
Improved diet only (1 year)	159	119	75.0	7	6.0	33	19.0
Diet unsatisfactory, no mouth wash used (1 year)	74	13	18.0	36	49.0	25	33.0

Bunting, R. W., Jay, P., and Hard, D. G.: J. Amer. Dent. Assoc. 18: 672, 1931.

how it could explain the findings. In the last two named groups active caries was very abundant, while it was absent to almost as high a degree in the first three groups mentioned. The laws of probability are wholly against heredity as the explanation for the condition found in these children.

AGE IN RELATION TO INCIDENCE OF DENTAL CARIES

Hess and Abramson regard a period of rapid growth, such as adolescence, as the most important predisposing factor in the development of this disease. Charts 1 and 2 give data on the percentage of teeth that become actively carious in various age periods. We know that adolescence is characterized by considerable metabolic and endocrine instability, associated with rapid growth and usually an insatiable desire for

food. What bearing this has on the appalling incidence of this disease is not yet known.

RÔLE OF PREGNANCY AND LACTATION AS FACTORS IN CAUSING INCREASED INCIDENCE TO TOOTH DECAY

Here again there is an old saying that every baby means the loss of a tooth. The general public believes this, but there are few or no data to support it, particularly with reference to pregnancy. Toverud and Toverud report an exhaustive piece of work on mineral metabolism during pregnancy and lactation on a group of women in Oslo. They state

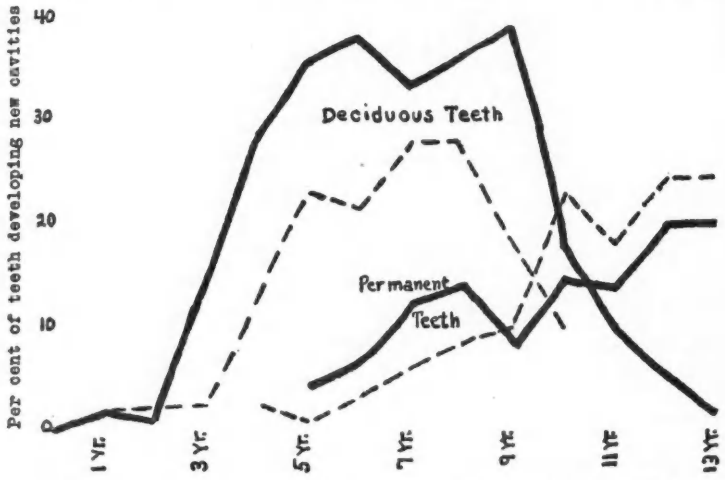

CHART 1. INCIDENCE OF CARIES IN DECIDUOUS AND PERMANENT TEETH OF WHITE AND COLORED CHILDREN UNDER 13 YEARS OF AGE

(Gay, T. B.: J. Med. Assoc. Georgia, Jan., 1931, p. 3)

White children ———— 2,053 Colored children ---------- 1,454

that in Norway caries is very prevalent in childhood, puberty, pregnancy, and lactation. The native diet of their women is notably deficient in calcium, as is that of many in our own country. The authors report that they found evidence of disturbances in calcium and phosphorus metabolism associated with pregnancy and lactation. Negative balances were found in practically all cases during the last two months of pregnancy unless the diet contained at least 1.6 grams of calcium and 2.0 grams of phosphorus per day. Such intakes of these minerals are almost unknown among women of Norway represented by those he studied,

when left to their own choice of food. The authors were able to keep the women in positive balance by suitable additions of milk and cod liver oil, during lactation as well as during the latter part of the gestation period. It is not known to what extent the teeth of women in negative calcium balance due to these conditions, are actually decalcified. Toverud and Toverud *assume* that it is this which causes the increased

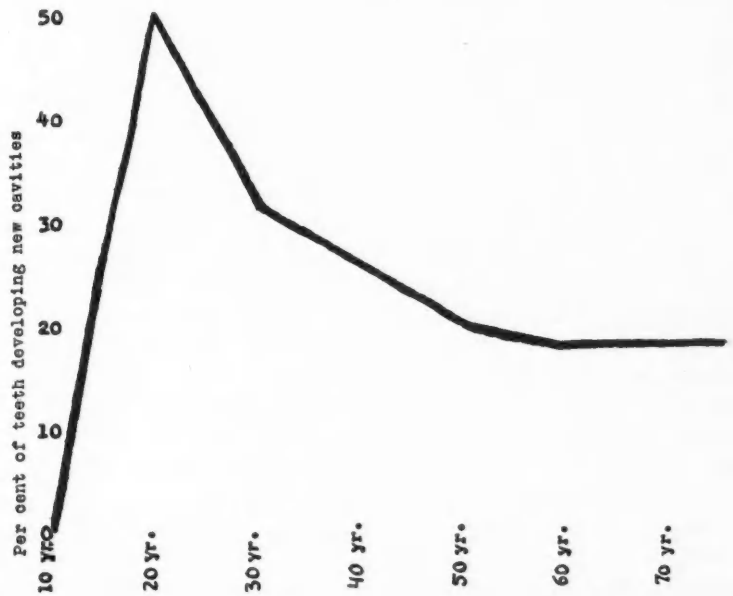

CHART 2. AGE INCIDENCE OF DENTAL CARIES, SHOWING MAXIMUM SUSCEPTIBILITY DURING ADOLESCENCE

(Hess, A. F., and Abramson, H.: Dental Cosmos, 73: 849, 1931)

incidence of caries among Norwegian mothers. Bauer, Aub and Albright, in Boston, demonstrated that the trabeculae of the bones of dogs decalcify rapidly under such circumstances, but made no observations on the teeth, unfortunately.

Macy and co-workers, and Hunscher, have made some valuable contributions to our knowledge of metabolism of women during pregnancy and during and after heavy milk production periods. Hunscher reported that with the methods and technique used, which are admittedly unsatisfactory, no demonstrable changes could be shown to be caused by

lactation. No new cavities appeared during the first six months of lactation, in the subjects she studied.

THEORIES INVOLVING THE GROWTH ON THE TEETH OF HIGHLY ACIDURIC ORGANISMS, AS THE PRIMARY CAUSATIVE AGENT IN THE FORMATION OF CAVITIES

Bacillus acidophilus in its various forms is most generally conceded to be responsible for the fermentation of carbohydrate to lactic acid, in protected areas on the teeth. It is this acid which, according to the theory, eats away the enamel and forms the cavity. It is believed that the organisms are held in place on the teeth by a film or plaque. There is no agreement as to the chemical nature of this plaque, and no knowledge about its rate of formation and frequency of renewal, or to what substances it is permeable. What is the constant source of supply of carbohydrate on which the organisms feed and from which they produce so much acid? Are the bacteria under the plaque dependent only upon the minute amount of undigested carbohydrate simultaneously protected by the film? Is the plaque selectively permeable to carbohydrate and not to the buffer salts in saliva? Can starchy food be so tightly impacted between the teeth that starch-digesting saliva cannot dissolve it, or does the saliva of an immune differ in diastatic power from that of a susceptible? Can particles of water-soluble candy or sweet desserts be so tightly impacted that they are not washed out by the saliva before significant amounts of acid could be formed?

These questions are raised merely to help secure better explanations of what takes place on the tooth. Bunting (1929–1930) states, however, that the constant presence or the usual absence of bacillus acidophilus in the mouths of susceptibles and immunes, respectively, is the most consistent difference yet discovered between these two groups of persons.

If we accept the theory that caries is primarily an infectious disease, will it be possible to control it by one of the methods which have been found so successful in preventing some of the other well-known infectious diseases? Can the organism be made to disappear by dietary corrections likewise? If so, there is certainly no agreement at present as to what specific dietary constituent or constituents is effective in bringing this about.

There is great need of a practical and dependable quantitative method for estimating the concentration of aciduric organisms in the mouth. Such a method in the hands of those thoroughly familiar with the peculiarities and idiosyncrasies of the organisms involved, will do much to

clear up certain aspects of the problem and to prove conclusively their relation to caries.

Probably the majority of those studying the etiology of caries today would be willing to grant that the cavity starts because the enamel is etched away by acid formed in protected areas on the surface of the tooth due to bacteriologic fermentation. However, investigators differ widely in their explanations of what determines susceptibility and immunity and in the relation of diet and metabolism.

In the first place, Hawkins in southern California has made the claim that the composition of the saliva with reference to certain factors is the determinant of immunity or suceptibility to caries. He has reported analyses of saliva for pH and for calcium content. His method of determining pH is open to serious criticism as is his statement that, by the method used, its value is a measure of the *acid-neutralizing power* of the saliva. Hawkins believes that immunity is characterized by high salivary calcium or high pH (alkaline) or both, the calcium filling up the less dense areas in the intercementing substance of the enamel. Susceptibility is characterized by low salivary calcium and low pH, with resultant inability to neutralize acid formed on the surface of the tooth by bacterial action. He did not, however, carefully standardize conditions for collecting salivas and his records do not show sufficient repetitions of determinations on the same subjects. Serious consideration cannot, therefore, be given to his conclusions. Hawkins believes that a base forming diet protects against acid saliva, while an acid forming diet is certain to result in this condition. The problem is not so simple as he would lead us to believe.

Horton, Marrack, and Price report reductions in concentration of salivary calciums in active caries, but contend that these reductions are secondary to the initiation of caries and bear no causal relation.

Karshan, Krasnow, and Krejci recently reported extensive analyses of blood and saliva of immunes, susceptibles, and persons with arrested caries selected among students at Columbia University. They found a slight reduction in salivary phosphorus, but not in calcium in susceptibles. Blood phosphorus also seemed slightly lower in this group.

Stern has reported no differences in salivary pH in immune and susceptible children, but gives inadequate information on methods of collection and determination, which lessens the value of his data.

Bodecker believes that the ability of lactic acid formed on the surface of a tooth to etch away the enamel and initiate a cavity is dependent ultimately upon the alkaline reserve of the blood. He claims to have

evidence of a system of channels throughout the tooth which make both the dentine and enamel permeable to fluids from the pulp chamber. Bodecker believes that a dental lymph circulates in this manner to the surface of the tooth. If the blood serum has a sufficiently high acid-neutralizing power, then the dental lymph will likewise have a high alkaline reserve and will promptly neutralize acid as fast as it is formed on the surface of the tooth. So far this has been theory only. Bodecker has submitted no chemical evidence of significant differences in the alkaline reserve of the blood of susceptibles and immunes; in fact he has

TABLE 5

A study of composition of blood and saliva in relation to immunity and susceptibility to dental caries

	IMMUNES	ARRESTED	CARIOUS
	Number of persons in each group		
	17	6	21
Blood serum pH	7.43	7.42	7.44
Resting saliva pH	7.03	7.08	6.90
Stimulated saliva pH	7.54	7.40	7.39
Serum CO_2 capacity, vol. per cent	64.4	61.3	64.0
Serum CO_2 content vol. per cent	67.3	65.2	67.6
Titrable alkalinity, cc. N/50 HCl per 100 cc.			
Resting saliva	67	68	67
Stimulated saliva	126	118	116
Serum protein, per cent	6.5	6.4	6.6
Serum Ca, mgm. per 100 cc	10.6	9.8	10.8
Serum P, mgm. per 100 cc	4.1	4.1	3.7
Salivary Ca., mgm. per 100 cc	5.9	5.3	5.3
Salivary P, mgm. per 100 cc	11.3	11.6	9.9

Karshan, Krasnow, and Krejci: J. Dental Research 11: 573, August, 1931.

submitted no evidence whatever. Table 5 shows no difference in pH or carbon-dioxide carrying power of blood serum among the three groups of persons studied. Again, however, determinations were not repeated on the subjects at wide enough intervals to permit saying definitely that they were immune or susceptible as listed over a period of time under observation.

Jones, Larsen, and Pritchard have accepted the Bodecker theory as satisfactory explanation for the high incidence of caries and of another dental disease common in preschool children in Hawaii known as odontoclasia. The Hawaiian investigators include the composition of saliva in

their theory, Bodecker does not. Again, however, this group has not submitted *chemical* evidence in support of their stand. Decision as to the value of this explanation will have to await adequate evidence. Definite lowering of either pH or carbon-dioxide-carrying power of the blood is not generally regarded as consistent with normal health. Dental caries is a disease which often occurs in otherwise healthy people. Jones and co-workers believe, with Hawkins, that the secret of protection against caries lies in the consumption of a base-forming diet. If this is true, why is not caries prevalent among carniverous animals on their natural acid-forming diet?

Bunting and colleagues, probably the leading advocates today of the theory of close causal relation of bacillus acidophilus to dental caries, have reported (1930) demonstrations in orphanages and in other groups of children of school age (table 4). As a result, this group of investigators is inclined to believe that a "well-fortified" diet, containing milk, green vegetables, and fruit, a minimum amount of sweets, but no cod liver oil or viosterol, is effective in decreasing the incidence of active caries.

In the first group included in table 4, among the 125 children who showed no new cavities and no extensions of existing ones during the year they were under observation, 52.8 per cent had open cavities at the beginning of the period. These cavities received no dental care during the year. Fifteen per cent had had cavities which, however, had been filled. In the second group included in table 4, among the 118 children who showed no new cavities and no extensions of old ones during the experimental period, 48.3 per cent had open cavities on first examinations which likewise were not filled during the year. Cavities that had already been filled were found in 10.2 per cent of the children. In groups 1, 2, and 4, however, the authors believe that the children who showed the most active lesions on first examination were new-comers in their respective institutions. No records are available, unfortunately, for any of the groups studied, as to the comparative rate of development of new cavities in the previous year, and there are likewise no records as to the exact extent to which the institutional diet for groups 1, 2, and 4 was changed during the period the children were under observation, as compared with the year immediately preceding.

Bunting and colleagues are not prepared as yet to state whether it was the omission of sweets *per se*, or a resultant increase in consumption of the basal well-balanced diet that was the effective agent in decreasing the incidence of caries among the three groups of children. Further informa-

tion on this point will be forthcoming from this laboratory as soon as experiments now under way are completed.

The investigators have not included in their reports any information as to the progressive changes in the bacterial flora of the mouths of these children, for correlation with the dental findings.

McCollum (1931) believes that the primary lesion in caries is caused by acid produced by the growth on the teeth of microörganisms, but further states "I do not believe that the development of dental caries is dependent *solely* upon the action of acids." He is of the opinion that sound tooth structure, adequate intake of vitamins A, D, and C, and of calcium and phosphorus are all equally important and that the *resistance of the tooth itself* to the action of acids can be built up by suitable dietary practices.

Mrs. Mellanby's views have already been expressed. She, too, concedes that the primary lesion is caused by acid produced on the surface of the tooth, but that adequate protection against the effects of this acid can be built up, whether the tooth is sound or imperfectly enamelled, but more readily in the sound tooth, by improving the quality of the secondary dentine. Normal calcium and phosphorus metabolism and adequate vitamin D are the controlling factors in her opinion. Eddy, likewise (1931) says that the Miller theory involving aciduric organisms is reasonable so far as it goes, but that the tooth is a living part of the body and its resistance to its environment may be influenced by factors that control its structure. He strongly believes in the importance of an adequate intake of vitamin C as an aid in building up the resistance of the tooth to caries.

THEORIES IN WHICH DENTAL CARIES IS REGARDED AS PRIMARILY METABOLIC, ENVIRONMENTAL FACTORS BEING OF VERY MINOR IMPORTANCE

The chief advocates of this theory are those who regard an adequate intake of vitamin C as the most important protective factor. Howe, of the Forsythe Dental Clinic, Boston, is probably the leading representative of this group. Höjer (1926) and Wolbach and Howe (1925–1926) report the pathological effects of insufficient amounts of vitamin C on the erupted tooth. The cells of the body become unable to produce and maintain inter-cellular substance. In teeth the odontoblasts continue to produce a normal fluid but this does not harden into dentine. This internal derangement of tooth structure is the first demonstrable manifestation of scurvy and can be detected in experimental animals

when the amount of this vitamin is sufficient to prevent all *outward* scorbutic symptoms. Vitamin C seems to supply or be a precursor of this pectin-like substance which permits the formation of normal dentine.

Howe also believes that the diet should contain adequate amounts of calcium, phosphorus, protein, bulk, and vitamins A and D, but does not give vitamin D the prominence as a protective factor attributed to it by the Mellanbys.

Hess and Abramson regard caries as an essentially systemic disorder in which rapid rate of growth with its attendant metabolic stress and strain is the most prominent predisposing factor.

Hanke (1931) is more inclined to regard the initial lesion as due to proteolytic organisms which disintegrate the cement that holds together the enamel rods. He believes that caries can be arrested by proper

TABLE 6

Effect of season and of feeding a daily supplement of one pint orange juice, on the calcium and phosphorus content of the blood serum of 340 children, 12–18 years old, living in an institution

	TOTAL SERUM CALCIUM		ULTRA-FILTERABLE CALCIUM	TOTAL SERUM PHOSPHORUS	
	Spring	Fall		Spring	Fall
	mgm. per cent	*mgm. per cent*	*mgm. per cent*	*mgm. per cent*	*mgm. per cent*
Pre-orange juice period	10.87	10.34		4.45	4.30
After six months on orange juice supplement	10.56		5.76	4.20	
Controls, no orange juice	10.44		5.73	4.52	

Hanke, Needles, and Marberg: Amer. Chem. Soc., Buffalo, September, 1931.

feeding and emphasizes, as does Howe, the great importance of vitamin C. Both advocate the daily consumption of a pint of orange juice if caries and gingivitis are to be avoided.

At the recent meeting of the American Chemical Society in Buffalo, a paper was reported by Hanke and colleagues, giving the results of determinations of the total and ionizable calcium and of the phosphorus in the blood sera of three hundred children before receiving this pint of orange juice, and six months afterward. No significant differences were found as a result of this treatment.

Manifestly a pint of orange juice contains many substances of value in nutrition besides vitamin C. Nevertheless, we shall all await the final publication of the findings in the Mooseheart demonstration. Even though this amount of orange juice, given as a daily supplement to the

common institutional diet of this large number of children for one year, does result in an elimination of caries or gingivitis or both, we still will not know what was the effective protective constituent. We will need such information in order to interpret to the public the success of this daily supplement to the diet in terms that are economically practical.

Boyd and Drain (1929) report remarkable success in arresting dental caries in diabetic children on a carbohydrate-restricted diet, nutritionally adequate in every respect according to accepted standards. The same success was met with in giving non-diabetic carious children this same type of diet. The sugar content of the average diet was ruled out, however, by their demonstration that cases of celiac disease, placed on a diet that was equally satisfactory nutritionally, but which contained a considerable amount of simple sugars, responded just as successfully. They are inclined to the belief that caries is a metabolic disorder induced by diets that are deficient in one or more essential nutritive constituents.

GENERAL SUMMARY

This review is presented in an effort to show the many types of problems involved in seeking the cause of what is probably the most widespread disease known. The solution of the problem will require the united efforts of trained biochemists, nutritionists, bacteriologists, physicians, and dentists. It is sincerely hoped that it will help to show the futility of researches in only one or two of these related fields, ignoring the others.

The following appear to be the weak spots in the present day theories.

1. Lack of a dependable quantitative method for estimating the concentration of acid-forming bacteria in mouths.

2. Lack of convincing evidence of significant differences in the chemical composition of blood and saliva, or in the mineral balance of those free from caries as compared with those very susceptible to the disease.

3. Lack of incontrovertible data—bacteriological, chemical, or nutritional—as to what determines resistance or immunity to caries.

4. Lack of agreement as to what, if any, constituent or constituents of the diet favor the development of caries or prevent its development.

5. Lack of a satisfactory explanation as to how bacteria are held in place, with their acid protected from contact with the highly buffered saliva. What is the constant source of food for the production of so much acid?

FACTS THAT MUST BE EXPLAINED BEFORE THE PROBLEM OF THE ETIOLOGY OF DENTAL CARIES IS SATISFACTORILY SOLVED

1. Some apparently structurally sound teeth decay rapidly, while some very poorly formed teeth with very imperfect occlusion remain free from decay.

2. Incisors and the buccal surfaces in general are much less susceptible to caries than are occlusal pits, proximal surfaces, and cervical areas. If caries is primarily of metabolic origin, why are not all teeth and all tooth surfaces equally susceptible?

3. Some persons on apparently satisfactory diets, and seemingly well-nourished, have many cavities, while others with poor food habits and showing evidences of malnutrition, have few or none.

4. Teeth of children living in certain orphanages have a relatively low degree of caries, while eighty to ninety-five per cent of public school children living in their own homes exhibit a high degree of susceptibility to the disease.

5. No one has ever been able to produce caries experimentally in dogs, even though poorly formed teeth can be produced in them at will. Caries has been found occasionally in non-experimental dogs but only in the cervical areas. Can this relative immunity to caries be explained on the basis of the conical shape of dog teeth and their natural self-cleansing arrangement which prevents adherence of food and micro-organisms? Certainly the metabolic theory does not satisfy us.

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THE DIETITIAN AS AN ADMINISTRATIVE OFFICER IN THE INSTITUTION*

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The increasing complexities of hospital management, brought about by the many advances in the field of medicine and its allied sciences, make it necessary that all those who occupy positions of responsibility in the institution possess the highest professional, mental and moral qualifications and that they be skillful in the application of their knowledge.

Every institution must have a chief executive officer in whom responsibility is centered and whose duty it is to coördinate all phases of the institution's activity. It is also necessary that there be a well balanced plan of organization, with definite understanding of the functions which each division is to perform and a thorough understanding of their relations to each other. It is the chief executive's task to devise that plan of organization that will best fit the institution and enable it to function to the best advantage. The chief executive, however, cannot personally direct every phase of the hospital's activity and must therefore, even in the smallest institutions, depend upon associates and assistants for particular portions of the work. In the larger institutions there will be a larger number of divisions and a restriction of their functions; as the chief executive's duties are thus more removed from the intimate detail of technical procedure, more responsibility falls upon the heads of the various divisions and more administrative duties are assigned to them.

Good management prescribes that divisional chiefs and sub-chiefs be carefully selected in the first place, that they be held accountable for the performance of their divisions and that superior officers shall not interfere, unless the subordinate proves to be incompetent. This is a lesson that many find it difficult to learn and that some never conquer.

It is unnecessary for me to remind this assembly that the culinary department is one of the very important divisions of the hospital. I have never been able to determine which department was most im-

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portant, for all are essential and no organization can function in the absence or failure of an essential part.

It was my privilege to be reared in a home where mother attended personally to all of the household duties. It seems to me when I endeavor to recall the routine of my boyhood days that a great deal of her time, thought and effort was devoted to the feeding of her family. Discussions concerning menus were frequent. All of the children participated in the activity, either as purveyor, scullery man or maid, waiter or waitress, dishwasher or what not. At times their participation was reluctant, but mother knew how to apply the necessary pressure to accomplish the task. Little was known of the science of dietetics in those days though they are not long passed, but though mother's methods were all empirical, due to family or racial tradition, local custom or born of her own initiative, her efforts in feeding her little brood were successful. We ate most of our meals at home; it was indeed an unusual event when any one was absent and most unusual when the family visited relatives or friends, rather they visited our home. Mother's efforts, though always sincere, were not always appreciated I fear, and complaints from one or another member of the group concerning the menu, the method of serving, or that their peculiar fancies were not given proper consideration, were not uncommon, but in a way known only to mothers the home dietary went on without interruption, the complainant was satisfied and the budget remained balanced.

I do not believe that in this day those conditions are duplicated in many homes, for it seems to me that few people consume three meals a day, day after day and week after week, in the same place. The nearest approach in our institutions is in hospitals for the chronic diseases, in tuberculosis sanatoria and among some of our personnel. In general hospitals, the patient's stay is of comparativly short duration and in these it is not the patients, but the personnel that often present the most difficult dietary problem.

I have approached my subject in this way in an endeavor to show you my attitude toward the dietitian's responsibilities. If, even in the small home, so much of the housewife's time and energy is devoted to the food service, how important it is that this phase of institutional activity be properly administered. Increase the number in the family to that represented by the hospital personnel, add to it the number of patients with all of their special requirements, realize that there is also included in this number every age group, various racial and religious groups, recognize that each individual has special food fancies and desires and you may

possibly be able to appreciate the task of satisfactorily conducting this phase of hospital function. Restrictions as to finances, personnel and equipment, and the physical plan of the buildings further complicate the situation.

In my humble opinion the task of properly administering a department which is called upon to provide a satisfactory food service in an institution, challenges the most efficient dietitian and calls for a manager of the highest type.

Just as the chief executive is responsible for the integration and coördination of all of the various divisions of the institution, so the dietitian is responsible for the execution of the several activities of her department and of the coördination of her division with all of those others with which it comes into contact.

Inasmuch as my subject refers to the dietitian as an administrative officer, I shall not discuss her professional or pedagogical qualifications. She must, of course, be adequately prepared in the scientific aspects of dietetics and as her teaching duties may involve student dietitians, nursing and medical students, patients and even the public, she should be properly prepared for this function as well.

From an administrative viewpoint, however, it is important that the dietitian in command of the food service in an institution be an executive. It is essential that she fully realize the principal purpose of the institution and the rôle that her division is to play in the accomplishment of that purpose, and that she have a clear understanding of the organization of the institution and the relation of her division to all other departments.

It is her responsibility to plan her own divisional organization so as to coördinate it with other divisions and to carry on its activities in the most efficient and economical manner.

The entire food service, beginning in some instances with procurement or purchase of supplies, in others with the receipt of the raw product and the planning of menus, through all stages of preparation, distribution, service to the individual, collection and disposal of waste, must be organized and the plan of action must be definite and in detail. Each procedure must be planned. None can be left to chance. The department must function with precision and without fail. Its activities must continue regardless of holidays or vacations and over a span of many hours each day. Aside then from the accurate knowledge of food values, food therapy, balanced menus and food preparation, the dietitian must be able to administer these other more or less mechanical procedures connected with food service. And not only must she be able to plan her

organizaton to fit local conditions and customs, but she must maintain a constant check upon it, in order to prevent deterioration and to improve it whenever opportunity permits. This latter procedure is often more difficult in practice than to inaugurate a new service in a new institution, for the old cry "we never did it that way before" is very difficult to overcome.

The dietitian who aspires to the management of a department must therefore be not only well grounded in professional knowledge and capable of applying that knowledge in a most practical manner, but also possessed of skill in the selection of personnel and in directing, supervising and coördinating the efforts of other people. This calls for a high degree of leadership.

Leadership in its final analysis may be said to be applied psychology. It will probably, however, never be reduced to an exact science. Though some may know and understand all of the factors essential in the make-up of the leader, they fail as such if they do not possess the art of applying their knowledge. The acquirement of ability in this direction is not the result of conscious effort, but rather the product of natural ability and chance.

It has been said of some persons that they were "born" leaders. This is to be doubted; rather they were persons possessed of a keen sense of perception, apt in making deductions and in applying the knowledge thus gained, who through personal contacts developed the art of leading.

Every administrative officer to be successful must exercise leadership. There are certain broad elastic principles upon which a discussion of the qualities that make for leadership may be based.

The mental attitude toward one's work is of great importance. Much depends upon the way in which life's work is approached. There must be profound conviction of the worthiness of the task and an earnestness of purpose that cannot be disturbed. There must be pleasure gained through work well done. Tasks must be approached with enthusiasm and regarded as worthy of one's best mettle and sustained effort. Sacrifices must be made willingly. The best executives lead through example rather than by edict or order. Through example, effort must constantly be made to imbue every individual in the organization with an enthusiasm for their work no matter how menial their task may be. Destructive criticism and the discontented, disloyal attitude must be discountenanced at all times.

Narrow mindedness has no place in the make-up of any administrative

officer. Religious, racial, political, personal or behavior prejudices will greatly hamper the executive in the performance of his or her duties. If such prejudices are entertained it will soon be discovered that subordinates are displaying similar tendencies and the organization will be disrupted by gossip, bickering, petty jealousies and misinterpretations, and will soon cease to function properly. Every executive must constantly cultivate the open mind and be tolerant of the opinions of others. This is particularly essential when the contacts are as intimate as they are among the departments and personnel of an institution.

The administrative dietitian or any other executive must be decisive without giving the impression of being dictatorial. Willing to listen, to have an idea expounded, even though not in sympathy, she must be ready to make a decision and to give logical reasons why such decision is being made.

There are many duties involved in the conduct of a dietary department that are onerous, distasteful and difficult. To have them properly performed often taxes the ingenuity and leadership of the best executive. Their proper performance is a true gauge of the executive's ability. Many of the tasks are menial and become monotonous. Employees are prone to neglect the smaller details. In the dietary department such neglect is sure to produce dissatisfaction with the finished product. Someone must maintain constant vigilance and the chief of the department is ultimately responsible. One of the most distasteful of all tasks connected with the food service is the routine inspection of the garbage, and yet there is no criterion of the service that is so accurate as this, if properly done by a responsible person. It is impossible, when large numbers are being served, to satisfy everybody, yet a brief study of the waste products will soon disclose whether or not food is being consumed or wasted and careful inspection will indicate whether certain items should be eliminated from the diet or fed with less frequency.

No executive has ever reached perfection and few have such an ideal. All aspire, however, to greater and better rôles in the drama of life. Those of us who are engaged in fields of personal service to our fellow men must dedicate ourselves wholeheartedly to our chosen tasks. If our recompense lies only in the monetary remuneration we receive, it would be better for all concerned if we entered some other field of endeavor not so closely related to human welfare.

The young woman who chooses to enter this field of service should do so understanding the difficulties of the work and prepared to devote her

time and energy to the performance of her duties. The opportunities for service are many. The remuneration in monetary return is modest, but in terms of satisfaction and pleasure of accomplishment, is beyond measure for the qualified dietitian who earnestly devotes her talents to the work.

THE TREATMENT OF PEPTICULCER WITH GASTRIC MUCIN*

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Although the direct etiology of "peptic" ulcer in man has never been definitely established, almost all accepted types of treatment for these ulcers have had as their objective the reduction of the free acid in the stomach. The surgical treatment either attempts such an extensive resection that the remaining gastric fragment can produce little or no acid, or mixes the duodenal or jejunal contents so that in either case gastric acidity should be radically reduced. The most common medical treatment is based upon the addition of sufficient alkali to render the gastric contents either neutral or alkaline, thus combating the irritative action of the gastric juice. An ideal therapeutic agent for this purpose in peptic ulcer therapy should, however, neutralize or combine with the acid without materially stimulating or depressing gastric secretion, without materially affecting gastro-intestinal activity, and without having a general systemic action. Obviously with these prerequisites, none of the alkalies at present used in the treatment of ulcer can be classified as ideal.

During attempts to inhibit free acid secretion in Pavlov pouch dogs, it was observed that practically in every case when the free acid was very low, an excess of mucus was present in the gastric contents and conversely when the free acid increased, little or no mucus was present. This observation was so consistent that a study of the rôle of mucin in gastric physiology with especial reference to its antacid character, was started.

In the literature on gastric secretion, the capacity of mucus to lower the free acid in the stomach is repeatedly suggested. In 1879, Heidenhein believed that mucus was alkaline, and later Pavlov (1) suggested that it was the mucus that lowered the free acidity of the stomach by neutralization. Ivy (2) made pouches of the pyloric antrum in dogs and found the secretion of these pouches to be "mucoid, viscous, tenacious, transparent, odorless and slightly salty. It resembled egg white in appearance and consistency, was slightly alkaline with a pH of 7.0 to 7.5 and neutral to

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litmus." Lim (3), in an exhaustive article on the relationship between gastric secretion and basal secretion of the stomach, states that: "it thus seems not unlikely that the colloid nature of mucus accounts (adsorption of alkali) for the titrable total acid found with the lowest secretory rates." He adds that "at lower secretion rates the concentration of mucus is unquestionably higher especially in the case of entire stomach juice, containing pyloric secretion which is continuous and little altered by secretory activity in the fundus."

These physiologic observations suggested gastric mucus as an ideal antacid in that (*a*) it combines readily with the free acid, (*b*) it is a natural substance which plays normally a protective, soothing and lubricating rôle in the functioning of mucous membranes, and (*c*) its secretion or ingestion causes no chemical disturbances in the body and no unfavorable effect on gastro-intestinal secretory or motor activity. To evaluate gastric mucus as an antacid, it was necessary either to stimulate the secretion of mucus by the gastric glands or to administer it by mouth. Increasing the bivalent anions in the circulation should stimulate secretion from the gastric mucous glands (4), but in these experiments on Pavlov pouch dogs no definite effect was discovered. The alternative procedure, then, was to prepare mucus from other sources and administer it orally to experimental animals and patients, with the hope that the measurable free acid would in this way be definitely lowered and the lower secretion rates of Lim would be reproduced.

An ideal preparation of mucus would have the characteristics of the mucus that Ivy isolated in his experiments on the pyloric pouch. A mucin resembling Ivy's very closely was prepared by precipitation from a dilute hydrochloric acid solution of gastric mucosa at a pH of 4. 5 after the addition of an equal volume of alcohol. When dried and neutralized to a pH of 7.0, it is mucoid, viscous, readily soluble in alkali, faintly soluble in water, and has a high combining power. One gram of this powdered mucin combines with about 15 cc. of 0.5 per cent hydrochloric acid.

EXPERIMENTAL RESULTS

The mucin prepared from the dog's gastric mucosa and used in this experiment has a high combining power with free acid, but does not depress gastric secretion. In fact, when equal quantities of this mucin in solution, egg albumin or gelatin, respectively, were put into the stomachs of Pavlov pouch dogs through a stomach tube, the mucin led to a slightly greater secretion of acid than either gelatin or egg albumin (chart 1).

It is well known that both egg albumin and gelatin are weak excitants of the gastric glands and for this reason they were contrasted to the mucin. Our results show that the mucin as prepared at present is only a mild gastric secretory excitant. These experimental results have been confirmed by Ivy and Lim, who report the following from the hog gastric mucin with which I supplied them. "(1) The hog's gastric mucin used has a high combining power (1 gm. combining with from 12 to 15 cc. of

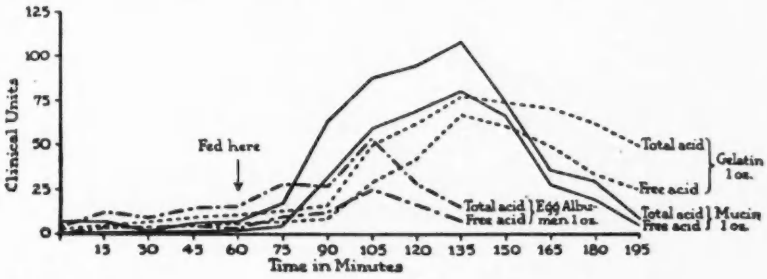

CHART 1. TYPICAL GASTRIC ANALYSIS ON FEEDING DOGS 1 OUNCE OF MUCIN, GELATIN AND EGG ALBUMIN

From the free and total acid values shown here it is obvious that mucin as at present prepared is a slightly greater gastric stimulant than either egg albumin or gelatin.

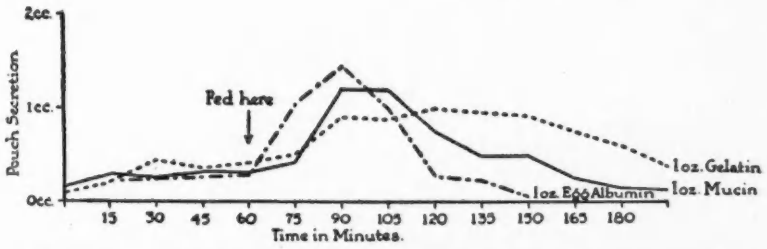

CHART 2. This chart supplements chart 1 and demonstrates that our preparation of mucin, put in the stomachs of Pavlov pouch dogs, will lead to about the same quantity of "pouch" secretion as gelatin or egg albumin.

tenth normal hydrochloric acid); (2) it does not irritate the gastro-intestinal mucosa; (3) it mildly stimulates the gastric glands and in its present form it excites the gastric glands on being perfused through a pouch of the entire stomach, which proves that it contains secretagogues."

When 2 ounces of mucin, egg albumin, gelatin or meat, respectively, were introduced by stomach tube into the stomach of the Pavlov pouch dogs and the dogs were excited to secrete gastric juice at the beginning of

the experiments by an adequate dose of histamine, it was noted that there was complete absence of free hydrochloric acid only in the stomachs

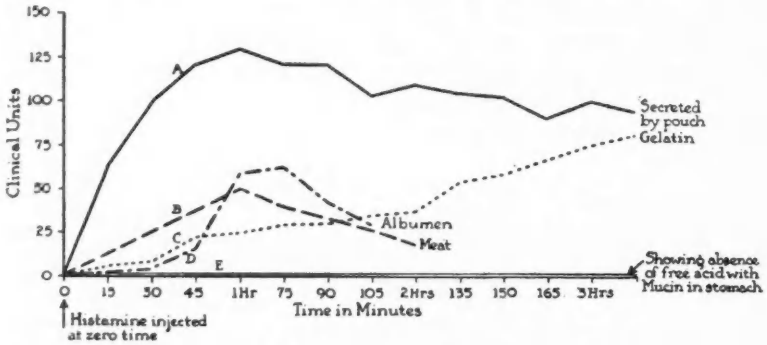

CHART 3. DEMONSTRATING THAT AFTER ADEQUATE STIMULATION BY HISTAMINE, AS SHOWN BY THE POUCH SECRETION, ONLY MUCIN WILL KEEP THE FREE ACID IN THE STOMACH AT ZERO

Only the free acid values are plotted in the chart: *A* is free acid value of the pouch secretion: *B* is free acid value of gastric contents with 4 ounches of meat in the stomach; *C* is free acid values of gastric contents with 2 ounces of gelatin in the stomach; *D* is free acid values of gastric contents with 2 ounces of egg albumin in the stomach; *E* shows absence of free acid with 2 ounces of mucin in the stomach.

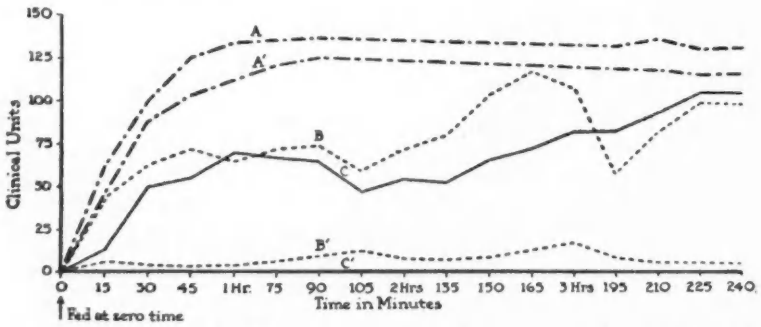

CHART 4. This contrasts feeding Pavlov pouch dogs 1 pound of meat alone, with 1 pound of meat mixed with ½ ounce of mucin. There is no free acid in the stomach when the mucin is added, as shown by curve *C'*. *A*, total acid value of pouch secretion; *A'*, free acid value of pouch secretion; *B*, total acid value of gastric contents with meat feeding; *B'*, free acid value of gastric contents with meat feeding; *C*, total acid value of gastric contents with meat plus mucin feeding; *C'*, absence of free acid in gastric contents with meat plus mucin feeding.

containing the mucin, whereas the Pavlov pouch in all cases secreted the usual free acid. These results show that the mucin has a high combining

power with free acid *in vivo*. Chart 3 shows a comparison of the free acid in the stomach when immediately after histamine stimulation 2 ounces of mucin, gelatin, or egg albumin, and 4 ounces of meat, respectively, were put in the stomachs of Pavlov pouch dogs.

Of further interest were the results obtained from feeding Pavlov pouch dogs a pound of meat in which there was mixed ½ ounce of powdered mucin. Meat itself, of course, has a high combining power, but in the controls that were fed meat alone some free acid was present in these dogs' stomachs throughout an observation period of from five to seven hours or until the stomachs were empty. But this free acid was absent in all cases when ½ ounce of mucin was added to the meat. This was especially significant as the pouches in all trials showed the expected stimulation (chart 4).

Encouraged by these results in animal experiments and because I was able to obtain a preparation of mucin free from intestinal parasites, ova and other objectionable features, I extended the experiments to cases of peptic ulcer in man.

CLINICAL RESULTS

In 1930, there were 34 patients with typical ulcer history available for study. Four of these had had a gastroenterostomy and now had the subjective and objective findings that indicated gastro-jejunal ulcers. Two had the surgery limited to the duodenum and were acutely ill when the mucin treatment was instituted. Two were diagnosed ulcers of the duodenum for the first time, and the remaining 26 had been treated over ninety times with the usual alkalinization and diet without persistence of relief; 16 of these 26 had been invalided from two to six months in 1929, and the symptoms had been present from two to seven years.

In the first six months of 1931, there was available for study another group of 34 cases. Six of these had had a previous gastroenterostomy, two had a duodenal perforation sutured and one a Billroth I. Only 2 of this group were diagnosed ulcer of the duodenum for the first time, and in the other 32 a diagnosis of ulcer of the duodenum had been made and symptoms had been present from two to twenty years before mucin therapy was started.

The general procedure was to give about 100 grams of powdered mucin per day. Half an ounce was given at 10:00 a.m., 2:00 p.m., 4:00 p.m., 8:00 p.m., 10:00 p.m., and in addition 15 to 30 grains of mucin was given in capsules on the hours when the large doses were not given. In the very severe cases, 10 grams of mucin were given hourly until the acute symp-

toms subsided. The diet consisted of the usual bland convalescent ulcer diet, being practically the Alvarez ulcer diet. All the vitamins were included in liberal quantities.

In 33 of the 1930 cases, the subjective symptoms disappeared within three days of treatment, the most gratifying feature being the persistent abscess of pain, the gain in weight and the increase of hemoglobin and red blood cells. As yet there has been no recurrence in this group, although one of the worse cases had a very severe attack of Ludwig's angina. The one failure in this group did not respond to mucin therapy, despite rigid adherence to the prescribed routine, and has been lost for further observation.

The relief of subjective symptoms in the 1931 group has been just as dramatic, there being one questionable failure in the case which had the Billroth I. This patient had an excellent response for six weeks, only to have a recurrence of pain, which is believed due to his having been treated by error with mucin which had spoiled in manufacture. The most gratifying feature of this group has been the excellent response of the patients with the gastroenterostomies. All these have been rendered symptom free and restored to complete economic fitness.

It is impossible for the average patient to take mucin in $\frac{1}{2}$ ounce doses unless he be properly instructed how to mix and how to disguise the mucin so that its odor and its viscosity will be minimized. Experience at the Wesley Memorial Hospital of Chicago has taught me that it is impossible to trust this to anyone but graduate dietitians. In fact, the entire mucin therapy hinged on the coöperation of Miss Elizabeth Tuft, chief dietitian, who prepared menus disguising mucin so that it would be palatable and still none of its chemical or physical characteristics be lost.

The simplest way of taking mucin for the average patient is to make a paste of the $\frac{1}{2}$ ounce dose in cold water, slowly eliminate all the lumps, and then add this paste to one glass of milk containing about two tablespoonfuls of a chocolate syrup such as is prepared by the Hershey Chocolate Company. If this makes too viscous a mixture, more than one glass of milk should be used, its amount depending upon the individual taste of the patient. In a similar fashion, the much advertised Blue Ribbon Malt Toddy or Horlick's Malted Milk may be used as a vehicle in which mucin can be suspended.

For those patients in whom the gain of weight becomes an undesirable factor, mucin may be disguised in neutral fruit juices. Great care must be taken with most of the canned fruit juices, as they are about the same pH as gastric contents and if mixed with mucin reduce radically its acid combining power.

Under no circumstances should any of these ulcer patients be given alkalies, as for example the Sippy powders, and since the average ulcer patient has been on large doses of alkali for a long time, their sudden withdrawal leads to marked hyperacidity for several days. The most success-

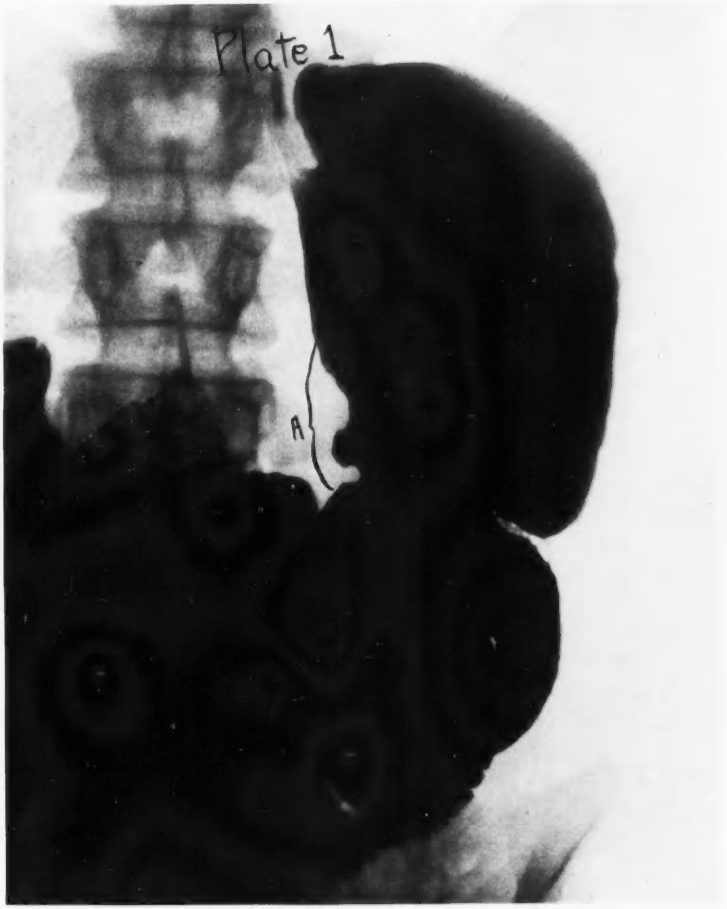

PLATE 1. *A*, LARGE GASTRIC ULCER WITH TYPICAL NICHE, OF TEN YEARS' DURATION

ful technique of combating this hyperacidity consists in repeated stomach washings, done as a rule by the patient himself, and followed by the insertion of about a half ounce of mucin in a watery paste through the stomach tube. Fortunately, most of these symptoms disappear within

three days, and the usual routine will then keep a patient very comfortable.

PLATE 2. *A'*, AFTER FOUR WEEKS OF MUCIN TREATMENT, SHOWING THE ULCER MUCH SMALLER, WITH NICHE STILL PRESENT BUT MUCH LESS PENETRATING

This patient's weight went from 90 to 120 pounds during the four weeks of treatment, with complete disappearance of symptoms.

The only difficulty thus far experienced in the entire mucin therapy for gastric ulcer has been its administration, and the feasibility as well as the

practicability of this new rational physiologic treatment for peptic ulcer rests entirely with the dietitians. A dietitian must understand that the objective of this treatment consists of the presence of mucin in the stomach practically the entire twenty-four hours of the day, and also that most ulcer patients are so tired of their unappetizing diet that great ingenuity must be exercised to have them continue their treatment for at least six months, the time necessary to prevent recurrence of symptoms in the average ulcer.

COMMENT

It is realized that periods of observation varying from three to twenty months cannot justify any thought of cure in this small series of 68 cases. But since mucin from a theoretical and experimental point of view proves to be practically ideal, an extensive clinical trial is indicated. The mechanism that afforded the relief from symptoms may be the combination of the free hydrochloric acid with the mucin, although another important factor is present that cannot be ignored. J. E. Whitlow, (5) studying the protective rôle of gastric mucus against the proteolytic action of gastric secretion, concluded:

1. Gastric mucus does delay and inhibit—though not prevent—the diffusion of hydrochloric acid and pepsin.

2. The rate of diffusion of hydrochloric acid through gastric mucus is inversely proportional to the depth of mucous layer and inversely proportional to increase in viscosity of the mucus; the diffusion of pepsin is directly proportional to the time required for the hydrochloric acid to diffuse through the entire depth of the mucous layer.

3. The presence of tenth normal hydrochloric acid in gastric mucus hastens the rate of diffusion of pepsin through a layer of mucus.

4. The fact that gastric mucus covers the mucous membrane of the stomach with a viscid, tenacious coat that retards digestion and diffusion of gastric juice, as shown by *in vitro* experiments, makes it impossible to deny the protective rôle of this secretion against autodigestion of the stomach.

5. The most direct evidence of all, however, is the fact that when the mucus is wiped away with a cotton swab and tenth normal hydrochloric acid or normal gastric juice is applied, bleeding occurs, and when the surface is merely swabbed with equal vigor and mechanical irritation, no bleeding occurs. It becomes a self-evident fact, therefore, that mucus protects the gastric mucosa against the action of gastric juice.

Similar results are reported by Klug (6) and it is highly probable that the

relief from symptoms obtained from feeding the mucin preparation was secondary to two factors. First, the mucin coated the ulcer and protected it against the proteolytic action of the gastric secretion, and second, through its high combining power with free acid it united with enough hydrochloric acid not only to neutralize the corrosive action of gastric juice, but also to prolong the rate of dialysis of pepsin through the now present protective mucin layer. Obviously, both these factors would be important in affording relief from pain and in hastening healing.

SUMMARY

1. Gastric mucin prepared from hog's stomach is only a mild excitant of gastric secretion.

2. Gastric mucin has a high combining power. Two ounces of mucin placed in the stomach of the dog was more than sufficient to combine with the acid secreted in response to the injection of 1 mgm. of histamine.

3. When ½ ounce of mucin was mixed with a pound of meat and fed to a dog, free acid did not appear in the dog's stomach throughout the period of observation of from five to seven hours.

4. Complete relief from symptoms for varying periods of from three to twenty months and complete restoration to economic fitness, was afforded to 66 of 68 patients with classic ulcer histories and roentgen findings of peptic ulcer, by the feeding of about 100 grams of powdered neutral gastric mucin obtained from hog gastric mucosa. As a rule, ½ ounce was given at 10:00 a.m., 2:00 p.m., 4:00 p.m., 8:00 p.m., and at 10:00 p.m., and in addition from 15 to 30 grains of mucin in capsules on the hours when the large doses were not given.

5. To make this treatment a practical success, intelligent coöperation by capable dietitians is essential. Every patient must be educated to mix mucin in adequate doses so that it is disguised and rendered palatable. That this can be done with individualization of the patient is obvious, as the dietitians at Wesley Memorial Hospital have been able to educate over four hundred patients not only to take mucin, but to continue taking it for the necessary six months.

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WHEAT BRAN AS A SOURCE OF VITAMIN B*

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In 1915 McCollum and Davis (1) showed that the wheat kernel must be supplemented by protein, mineral salts, and vitamin A in order to support normal growth and reproduction of rats; and a little later McCollum, Simmonds and Pitz (2) arrived at the conclusion that "as small an amount as 15 per cent of whole wheat as the source of water soluble B suffices for completion of growth in the rat and so promotes well-being as to induce the production of a nearly normal number of young." It was not enough, however, to enable the young to develop to the weaning age.

In 1919 a very thoroughgoing investigation of the nutritive value of the wheat kernel and its milling products was made by Osborne and Mendel (3). In a diet otherwise adequate in which the "water-soluble vitamine" was supplied exclusively by 15 per cent whole wheat or by 2 to 5 per cent commercial wheat embryo, they found that young rats would grow well. In testing commercial wheat bran (which always contains a little endosperm and possibly traces of embryo), it was found that 5 per cent as the source of "water-soluble vitamine" would not support growth of young rats nor even maintain adults. When, however, 55 per cent of commercial bran (equal to 45.5 per cent pure bran) was fed, the addition of wheat embryo had no further beneficial effect, showing that the commercial bran furnished enough water-soluble vitamin at that level. To discover whether or not the vitamin was localized in the embryo, the latter was very carefully dissected by hand from the remainder of the kernel. On feeding the pure embryo alone, in diets adequate save for the water-soluble vitamin, the rats were maintained for many weeks in apparent health, but made no appreciable growth. On the other hand, the embryo-free kernels proved as efficient in promoting growth as the intact grain.

This observation raised a question as to whether the water-soluble vitamin is a single substance, which has more recently been answered by

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the differentiation of the antineuritic, appetite and growth-promoting vitamin B from the antipellagric, and growth-promoting vitamin G. The wheat kernel, while rich in vitamin B, also contains some vitamin G. Sherman and Axtmayer (4) found vitamin G to be the limiting factor of the vitamin B complex of whole wheat, which is therefore relatively richer in the antineuritic vitamin.

In 1922 Bell and Mendel (5), using mice instead of rats, made a still more careful study of the distribution of vitamin B in the wheat grain and obtained good growth when the vitamin B was furnished by 20 per cent of commercial bran, the animals being "particularly sleek and healthy in appearance." These authors estimated that the bran contained about 24 per cent of the total vitamin of the wheat kernel.

In 1927 Plimmer, Rosedale and Raymond (6), using pigeons, found that a diet consisting of from 40 to 50 per cent whole wheat, 5 per cent fish meal, and white rice to make 100 per cent would be adequate for maintenance. Of wheat germ only 6 per cent was required. Bran was about one-fifth as rich in vitamin B as the wheat germ, 33 per cent being necessary to maintain the weight of the birds.

When Osborne and Mendel made the investigation referred to above (3) they remarked:

> Whenever bread made from highly milled flour forms an unduly large proportion of the diet of children the vitamine deficiencies which the experiments described in this paper make so evident, may lead to malnutrition. In this country there is relatively little occasion to be concerned on this score, because, as we have already pointed out, the food habits of our people are such as to make cases of this kind comparatively rare.

In the years that have elapsed since these words were written, much evidence has accumulated regarding the value of liberal amounts of vitamins for health and growth. Sherman and MacLeod (7) have contributed impressive evidence that a diet which may be adequate for the development of the individual to normal adult size, can be greatly improved as shown by earlier maturity of the animals, longer adult life, greater number of offspring reared, and delayed onset of senility, the whole life span being increased about 10 per cent.

More specifically with regard to vitamin B, Daniels, Byfield and Shaw (8), Hoobler (9), Dennett (10) and Bloxsom (11) have reported better appetite and digestion, better growth and greater vigor, upon increasing the vitamin B content of the diets of infants through the use of wheat germ extract, or of brewer's yeast rich in vitamin B. So too, Morgan

and Barry (12) found that school children fed rolls containing 50 per cent wheat germ showed in the course of about 7 months an increase of weight about three times as great as controls given an equal amount of rolls made from white flour. The rolls containing the wheat embryo were at least four times as rich in vitamin B as whole wheat bread.

McCarrison (13) has repeatedly called attention to the low state of health of the alimentary tract in cases where the vitamin B intake was low, and has shown experimentally in monkeys striking differences in the condition of the intestinal musculature. These findings have been extended to human beings by Fletcher and Graham (14) who report markedly beneficial results following the administration of yeast or commercial wheat germ to patients suffering from chronic arthritis, in whom the intestinal tract was markedly atonic.

In view of such developments in our knowledge of the value of a liberal use of vitamin B in the diets of people of all ages, it has seemed worth while to determine quantitatively the amount of vitamin B in a commercial preparation of bran, specially steamed and then forced through small perforations to make a crumbled product of good texture and flavor for human use. We were also interested to learn whether any considerable loss of the vitamin occurred in the manufacture of the product.

Accordingly, 53 albino rats of known heredity, reared from mothers on a diet of one-third whole milk power, two-thirds whole wheat, and sodium chloride equal to 2 per cent of the weight of the wheat, plus small amounts of fresh lean beef and lettuce regularly, have been placed at weaning time on a vitamin B-free basal ration of the following composition:

Vitamin B-free basal diet

	per cent
Casein (extracted, free from vitamin B)	18
Osborne and Mendel salt mixture	4
Cod liver oil	2
Butter fat	8
Cornstarch	48
Baker's yeast (neutralized and autoclaved 6 hours at 15 pounds)	20

All the animals were kept on this diet for about two weeks to insure full depletion of any possible reserves of vitamin B, as recommended by Chase and Sherman (15).

1. Ten animals were reserved as negative controls and maintained on the basal ration until death, which occurred in from 10 to 28 days, after marked loss of appetite and decline in weight.

2. Ten rats were placed on 0.6 gram of the prepared bran and observed for the prescribed period of 8 weeks, during which time they made an average gain of 18.1 grams ±3.3 per rat.
3. Ten rats were placed on 0.8 gram of the prepared bran and made an average gain for the 8 weeks of 56.8 grams ±4.4 per rat.
4. Four rats placed on 1.6 grams of the prepared bran made an average gain for the 8 weeks of 108 grams per rat. These gained at a rate which is normal when referred to the Donaldson curves.
5. Three rats placed on 2.0 grams of the prepared bran made an average gain for 5 weeks of 86.0 grams per rat, confirming the findings of good growth on 1.6 grams.
6. Ten rats were placed on 0.3 gram raw bran, but one which died in the fourth week was excluded from the final reckoning. The other nine made an average gain for the 8 weeks of 28.7 grams ±3.8 per rat.
7. Ten rats were placed on 0.4 gram of raw bran and made an average gain for the 8 weeks of 42.7 grams ±3.1 grams per rat.

The average gains for the group on each dosage are shown in figure 1.

Chase and Sherman (15) have defined a unit of vitamin B as that amount which, fed daily under suitably controlled conditions, will bring about an average gain of three grams per week over a period of not less than four or more than eight weeks. Chase (16) found that a unit of whole wheat thus described was about 0.6 gram.

We have found that 0.6 gram of our commercial bran preparation fed seven times per week gave nearly unit growth. It appears, therefore, that weight for weight our bran preparation is somewhat lower in vitamin B value than whole wheat.

In this age of automobiles and other machines which relieve mankind of much physical labor, there is an inevitable reduction in the amount of energy which a man must obtain daily in order to maintain his body weight. With lowered intake of calories there is a danger that the other nutrients which have been customarily ingested along with the calories will also be reduced. It seems likely that mankind will need to give increasing attention to the ash and vitamin content of the diet until new food habits are established which guarantee liberal supplies of all these dietary essentials. One ounce of whole wheat bread will furnish 62 vitamin units, and 100 calories; one ounce of bran suitably prepared for human use, such as has been used in this investigation, will furnish at least 45 vitamin B units with not more than about 30 calories. One ounce will also furnish vitamin B equivalent to that in one very large

apple (100 calories) or five ounces of orange juice (60 calories). Without adding very greatly then to the total calories in the adult diet, bran may contribute appreciably to the vitamin B content.

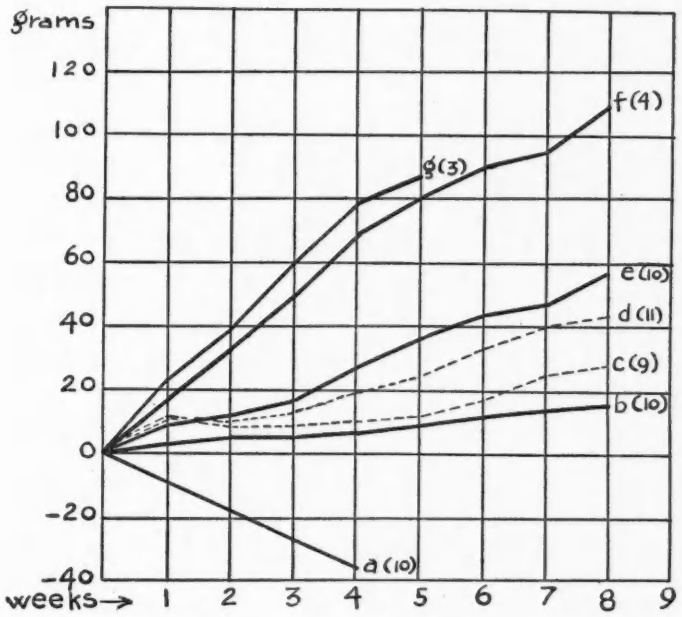

FIG. 1. INFLUENCE OF DIFFERENT AMOUNTS OF PREPARED BRAN (————) AND OF RAW BRAN (----------) ON GROWTH OF ALBINO RATS

Figures in parenthesis indicate number of animals. The daily additions to the vitamin B-free basal ration were as follows: (*a*) none; (*b*) 0.6 gram prepared bran; (*c*) 0.3 gram raw bran; (*d*) 0.4 gram raw bran; (*e*) 0.8 gram prepared bran; (*f*) 1.6 grams prepared bran; (*g*) 2.0 grams prepared bran.

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A STUDY OF CHINESE AMERICAN CHILDREN

II. Physical Measurements*

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It has long been recognized that Oriental peoples are smaller in stature than Occidental peoples. It was therefore interesting to compare the height, weight and surface area of the 22 Chinese American children whose dietary habits have previously been discussed (14) and whose basal metabolism will be reported in a later communication (15), with anthropometric measurements made on Chinese children, and also with the Baldwin-Wood (6) standards for American children.

LITERATURE

Early in the twentieth century, the medical missionaries Crook (12), Merrins (20), and Pyle (21), and an anonymous writer (1) independently measured children in South and Central China. In 1915, the China Medical Missionary Association appointed a committee to investigate the height and weight of Chinese children, for the purpose of establishing standards of development. Whyte (32), the chairman of the committee, published in 1918 the collected data from North and South China, on a total of 1684 boys and 438 girls. These early studies were not satisfactory because there were numerous chances for error in the collection of data. In the first place, the Chinese custom of considering a child one year old when he is born and adding the second year to his age on the next lunar New Year, made it necessary to subtract routinely, either one, or one and a half years from the stated age of the child, in order to secure the chronological age. Errors also arose from the facts that inaccurate measuring instruments were used and that the investigators did not observe proper technique.

Two years later, therefore, the research committee was reorganized and the use of calibrated instruments and standardized technique

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** The data are taken from the dissertation submitted in partial fulfilment of the requirements for the degree of Doctor of Philosophy, in the Department of Home Economics, University of Chicago.

recommended by Aleš Hrdlička (16) was advised. Accordingly, two members of the committee, Appleton and Shirokogoroff (2, 3, 22, 23) carried on extensive investigations, working both together and separately. They measured approximately 2000 children throughout large areas of China, and found decided anthropological differences among the many races of which the population of China is composed. This fact was confirmed by Stevenson (26) when he summarized in 1925 the data obtained by different members of the committee in all the provinces of China and in Manchuria. Although measurements for 9630 boys and 1233 girls were recorded, Stevenson considered that the figures from only three provinces were numerous enough to be statistically sound. These data formed the basis for growth standards for children of North, Central, and South China. Li and Chang (19) combined these three tables into one height-weight-age table which is designated as the most acceptable standard for all Chinese children to-day. The values in this table are considered preliminary, however, because the number of children measured, particularly girls, does not adequately represent the vast masses of children throughout the Chinese Empire.

Keys and Cadbury (18) and Hsu and Liang (17) each reported physical measurement studies on superior school boys in South China. The figures for the height and weight of these boys were greater than those reported for other children of the same age. The authors attributed this difference to the fact that the boys' fathers were wealthy merchants who were able to provide adequate diet and wholesome environment. The measurements and ages of the boys in the latter study had been taken according to Stevenson's outline of procedure (25, 27).

At a meeting of the National Medical Association of China in 1930, a proposal was made to carry on a nation wide study of height and weight measurements of Chinese school children in order to compile more accurate tables by which the nutritional status of children could be determined. In response to this proposal, Westbrook and Lai (32) published the measurements of about 2000 college and public school students in Shanghai and Woosung. Undoubtedly investigations will be completed in the near future which will give more accurate records of the size of Chinese children.

Anthropometric studies of Chinese children living in Hawaii were conducted first by Bobbitt (8) and later by Cox (9, 10, 11) and Appleton (4, 5). The results of these studies show that children of the second and third generations of Chinese in Hawaii are larger than those of the same age in China. The authors concluded also that their subjects were

of a more slender build than American children, or in other words, that they were taller for their weight, a body proportion which seemed distinctive of the Oriental race.

Thus it is seen that the tables compiled by Li and Chang are the best standards for Chinese children to-day. Since they were published, however, a large number of children have been, and are being measured, and without doubt there will be more adequate standards in the future, particularly for Chinese girls.

EXPERIMENTAL PROCEDURE

Height and weight measurements of 22 Chinese American children, 12 boys and 10 girls, between the ages of 5 and 17 were made in connection with the basal metabolism tests (15). Early in the morning before food had been taken, each child was weighed and measured without clothing, on a calibrated scale with a measuring stick attached. Standard equipment and procedure were used.

RESULTS AND DISCUSSION

The observed values for height, weight, and height-weight-index were compared with the figures given by Li and Chang (19), by Appleton (4, 5), and by Baldwin and Wood (6). Table 1 shows the height in centimeters compared with these standards. There were noticeable differences in the heights of children of the same age, the taller ones in general having had the most favorable environment. When compared with the figures reported from either China or Hawaii, the values for 7 of the children were more than 7 per cent below, and the value for only one child (V. F.) was more than 7 per cent above the reported values. The average percentage variations from the reported figures were similar, although those for the boys were closer than those for the girls. The heights of 21 of the children were below the Baldwin-Wood standards for medium sized children, 14 being more than 7 per cent below. When the values were compared with the Baldwin-Wood height-weight-age table, however, it was seen that 14 of the Chinese children were taller than American children of the same weight. This fact confirmed the findings of the investigators in Hawaii (4, 5, 9, 10, 11) that Chinese children are taller for their weights than Occidental children.

As a rule, the weights of the children studied varied with their heights, the children who were the tallest being generally the heaviest, although there were greater fluctuations in the values for weight than in those for height (table 2). The weights of 5 children were more than 7 per cent

above, and those of 9 more than 7 per cent below the Chinese standards. The average percentage variations, however, were slight. The subjects

TABLE 1

Height of children in this study compared with standards

CHILD	AGE	OBSERVED HEIGHT	PERCENTAGE VARIATION FROM STANDARDS			
			Li and Chang (1927) (China)	Appleton (1927–28) (Hawaii)	Baldwin and Wood (1925)	
					Average height for age	Height referred to weight and age
Boys						
		cm.				
E. C.	5	94.6	−9.4	−10.1	−12.4	+5.1
E. E.	5	99.7	−4.5	−5.2	−7.7	−2.2
H. I.	5	106.7	−2.2	+1.4	−1.2	+3.6
He. I.	7	111.8	−2.4	−3.4	−8.3	+2.6
W. F.	8	115.6	−3.1	−4.3	−9.0	+5.6
G. E.	9	117.6	−4.9	−6.5	−10.9	+2.2
Sh. C.	9	118.1	−4.5	−6.1	−10.6	+1.2
S. D.	9	127.0	+2.7	+0.9	−3.9	+4.3
V. F.	10	137.5	+8.4	+6.2	+0.2	+6.0
H. T.	10	128.3	+1.1	−0.9	−6.5	−4.3
F. E.	11	129.5	−1.4	−4.1	−9.0	+0.1
St. C.	11	137.2	+4.5	+1.5	−3.5	+1.2
Average			−1.3	−2.5	−6.9	+2.1
Girls						
M. Y.	5	102.2	−5.4		−3.0	−0.8
P. A.	6	97.8	−14.0	−10.9	−14.4	−1.2
H. A.	7	103.5	−11.7	−11.1	−13.3	−1.1
J. E.	7	108.6	−7.4	−6.7	−9.0	−0.1
G. M.	9	121.9	−3.7	−2.1	−7.7	+5.3
E. L.	9	125.1	−1.2	+0.5	−5.3	+1.7
L. F.	12	146.7	+4.4	+3.6	−0.4	+3.8
T. C.	13	132.7	−9.0	−10.3	−12.9	+4.5
J. T.	14	136.5	−7.8	−10.0	−13.3	−2.5
M.*	17	145.4	−5.8	−6.2	−10.6	−3.7
Average			−6.2	−6.0	−8.8	+1.1

* Omitted from average.

weighed slightly less than Chinese children in Hawaii, and much less, 21.6 and 24.3 per cent less for the boys and girls respectively, than medium sized American children of the same age. The weights referred

to height were quite close to the Baldwin-Wood standard, although 9 children were more than 7 per cent below them, and one child, 9.6 per cent above.

TABLE 2

Weight of children in this study compared with standards

CHILD	AGE	OBSERVED WEIGHT	PERCENTAGE VARIATION FROM STANDARDS			
			Li and Chang (1927) (China)	Appleton (1927–28) (Hawaii)	Baldwin and Wood (1925)	
					Average weight for age	Weight referred to height and age
Boys						
		kgm.				
E. C.	5	13.2	−11.4	−21.4	−27.5	−7.8
E. E.	5	15.9	+6.7	−5.4	−12.6	+1.9
H. I.	5	16.3	+9.4	−3.0	−10.4	−5.8
He. I.	7	18.2	−1.1	−11.2	−24.5	−4.2
W. F.	8	18.5	−13.6	−15.1	−29.9	−8.4
G. E.	9	19.4	−12.6	−19.5	−33.3	−8.5
Sh. C.	9	20.7	−6.8	−14.1	−28.9	−3.3
S. D.	9	23.1	+4.1	−4.1	−20.6	−9.4
V. F.	10	26.7	+11.3	+3.5	−17.3	−13.0
H. T.	10	28.6	+19.2	+10.8	−11.5	+9.6
F. E.	11	29.6	±0.0	−6.0	−25.3	−0.4
St. C.	11	29.5	+11.3	+4.6	−16.9	−3.6
Average			+1.4	−6.7	−21.6	−4.4
Girls						
M. Y.	5	16.2	+15.7		−8.0	+1.3
P. A.	6	15.0	−18.9	−13.3	−26.8	+2.0
H. A.	7	16.6	−17.4	−19.4	−26.8	+1.8
J. E.	7	18.1	−10.0	−12.1	−20.2	+0.6
G. M.	9	20.8	−11.1	−11.5	−28.5	−8.4
E. L.	9	23.2	−0.9	−1.3	−20.3	−4.1
L. F.	12	34.4	+5.5	+3.6	−15.1	−9.4
T. C.	13	27.6	−25.4	−26.2	−39.9	−7.1
J. T.	14	34.6	−12.0	−17.4	−33.2	−7.0
M.*	17	47.0	−1.1	+2.3	−14.5	+4.2
Average			−8.3	−12.2	−24.3	−1.8

* Omitted from average.

The weight-height-index, the weight in kilograms for each centimeter of height multiplied by 100, is sometimes considered an index of the state of nutrition of a child. This index is characteristically low for

Oriental children, and therefore the comparison of the indices of the children of this study with those reported by other investigators (table 3) might indicate whether or not the body proportions of these Chinese

TABLE 3

Weight-height-indices of children in this study compared with standards

CHILD	AGE	OBSERVED WEIGHT-HEIGHT-INDICES	PERCENTAGE VARIATION FROM STANDARDS		
			Li and Chang (1927) (China)	Appleton (1927–28) (Hawaii)	Baldwin and Wood (1925) (America)
Boys					
E. C.	5	14.0	−2.2	−12.6	−17.2
E. E.	5	16.0	+11.8	±0.0	−5.3
H. I.	5	15.3	+7.1	−4.3	−9.5
He. I.	7	16.3	−1.4	−7.1	−17.7
W. F.	8	16.0	−16.4	−11.1	−23.1
G. E.	9	16.5	−8.1	−13.6	−25.0
Sh. C.	9	17.5	−2.3	−8.4	−20.5
S. D.	9	18.2	+1.3	−4.7	−17.3
V. F.	10	19.4	+8.0	−2.5	−17.4
H. T.	10	22.3	+17.9	+12.1	−5.1
F. E.	11	20.5	+1.4	−1.4	−18.0
St. C.	11	21.5	+6.5	+3.3	−14.0
Average			+2.0	−4.2	−15.8
Girls					
M. Y.	5	15.9	+22.3		−4.8
P. A.	6	15.3	−5.8	−2.5	−14.5
H. A.	7	16.0	−6.5	−9.6	−15.8
J. E.	7	16.7	−2.8	−5.6	−12.1
G. M.	9	17.1	−7.7	−9.5	−22.3
E. L.	9	18.6	+0.4	−1.6	−15.4
L. F.	12	23.5	+1.1	+0.9	−14.5
T. C.	13	20.8	−18.0	−17.5	−30.9
J. T.	14	25.4	−4.5	−8.3	−22.8
M.*	17	33.2	+5.0	+8.3	−4.4
Average			−2.4	−6.7	−17.0

* Omitted from average.

children were being influenced by American environment. The observed indices were similar to those of Chinese children in China, 7 being within 8 per cent of the standards. They were slightly lower than those of Chinese children of the second and third generation in Hawaii, and

considerably lower than those of American children of the same age, the values for 17 children being more than 10 per cent below the Baldwin-Wood standards.

TABLE 4

Surface area of children in this study calculated according to various formulas

CHILD	BENEDICT-TALBOT MODIFICATION OF LISSAUER'S FORMULA†	DUBOIS' FORMULA‡	TAKAHIRA'S FORMULA§	TAKEYA'S FORMULA‖
		Boys		
	sq.m.	*sq.m.*	*sq.m.*	*sq.m.*
E. C.	0.59	0.58	0.59	0.61
E. E.	0.67	0.66	0.66	0.68
H. I.	0.72	0.70	0.70	0.73
He. I.	0.77	0.75	0.76	0.78
W. F.	0.78	0.78	0.78	0.81
G. E.	0.81	0.80	0.81	0.84
Sh. C.	0.84	0.83	0.84	0.87
S. D.	0.91	0.92	0.92	0.96
V. F.	1.04	1.03	1.04	1.08
H. T.	1.07	1.01	1.02	1.05
F. E.	1.01	0.98	0.99	1.03
St. C.	1.10	1.07	1.08	1.12
		Girls		
M. Y.	0.69	0.67	0.68	0.70
P. A.	0.65	0.63	0.64	0.66
H. A.	0.70	0.69	0.69	0.72
J. E.	0.75	0.74	0.74	0.77
G. M.	0.84	0.85	0.86	0.89
E. L.	0.90	0.91	0.91	0.95
L. F.	1.17	1.20	1.21	1.26
T. C.	1.01	1.02	1.03	1.06
J. T.	1.18	1.14	1.15	1.20
M.	1.45	1.36	1.38	1.43

† $K \sqrt[3]{W^2}$.

‡ $A = W^{0.425} \times H^{0.725} \times 71.84$.

§ $A = W^{0.427} \times H^{0.718} \times 74.49$ or $A = W^{0.425} \times H^{0.725} \times 72.6$.

‖ $A = W^{0.425} \times H^{0.725} \times 75.05$.

These observations show that the weight-height-indices of the children of this study varied little from those of children of the same age in China; apparently change of environment had not perceptibly influenced the bodily proportions of these Chinese children of the first generation in America.

On account of differences in the height and weight of Orientals and Occidentals, there has been discussion in the literature as to the accuracy of the formulas used for calculating the surface area of Occidentals when these formulas were applied to Orientals. Takahira (29) and Takeya (30) measured Japanese men, and from their results considered it necessary to increase the constant of the Du Bois (13) height-weight formula. Stevenson (24, 28) found by the measurement of Chinese men that the linear formula, with slightly changed factors, gave values nearer to the actual surface area than did the height-weight formula. Waddell, Han and Chin (31), however, found a close agreement between values obtained by the use of the two formulas.

The values for the surface areas of the children of this study, computed by four formulas, are recorded in table 4. The four values for the same child were similar, varying only from 3 to 8 per cent from each other. On the whole, the lowest values were found by the use of Du Bois' height-weight formula, and the highest by Takeya's modification. Since the Benedict-Talbot (7) modification of the Lissauer formula, adapted to the Du Bois linear formula, is often used for the calculation of the surface areas of children, the values obtained by its use were used in the studies on the diets and basal metabolism of the subjects of this investigation.

SUMMARY

The height and weight of 22 Chinese American children living in Chicago were obtained in connection with the basal metabolism tests, and the values were compared with American and Chinese standards.

1. The subjects were similar in height and weight to Chinese children measured in China. The observed values were slightly below those of Chinese children of the second and third generation in Hawaii, and appreciably below the Baldwin-Wood standards for medium sized American children. The average deviations from the standards for both height and weight were greater for the girls than for the boys.

2. These children were taller for their weight than American children, thereby showing their racial characteristics.

3. In general, the children who apparently had the best environment were the largest.

4. The surface areas of the children were calculated according to various formulas for Orientals and Occidentals. The results obtained were similar for the same child.

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THE DIETETIC ASPECT OF TREATMENT IN A MENTAL HOSPITAL

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In an organization caring for the mental patient, there are many factors from the dietitian's viewpoint which might be considered of importance towards establishing a background for normal life from the angle of well balanced and carefully served meals, or surroundings, atmosphere, and hospitality which lead to better balanced mental conditions.

The nutritional aspect and its relation to mental states is adequately dealt with in the research work of McCollum, Lusk, S. Morgulis, A. P. Mathewes, and many others. We find physical disturbances, due wholly or in part to impaired nutrition, which carry with them definite mental, nervous or emotional symptoms, notably in diseases such as beri-beri, pellagra, rickets, sprue, scurvy, secondary anemia, tetany, hypothyroidism and hyperthyroidism. These diseases may result in indifference, mental depression, lowering of sensibility and disturbance of sensation, delirium and convulsions, loss of mental vigor, excitement, mental dullness with an advanced deterioration, slow thought, irritability, physical instability, suspicion and defective memory. Carefully verified research on laboratory animals and man has led to these conclusions. Actual studies of the nervous system and endocrine glands in the normal person and those with disturbances of nutrition have also been made.

Controlled psychological tests made on the malnourished and metabolically disturbed, show that these persons may display mental abnormalities in the form of restlessness, inattention, poor memory, and mental retardation. The malnutrition may be due to insufficient total food intake, lack of adequate balance, or a lack of specific food constituents.

In the hospital we meet with many abnormalities which can frequently be overcome through the dietary department. In visiting the patients daily on the wards and in the dining room, we often find why the patients do not partake of food. They may have fears of food, poisoning, imagine they see insects in their food, hesitate to take food which they believe is not meant for them; they have ideas of unworthiness, fear of

contaminated food; some believe that they have no stomach or digestive tract. The patient may identify the various articles of food upon the tray as symbols or signs and refuse to eat, or the food may seem to be covered with animals, or in a phantasy he may be watching objects play about on the tray. Some think that when they partake of food it will rain. In great distress others point out disgusting and nauseating articles which they see on their dishes, when in reality the trays are very attractive and appetizing. Others throw food away, hide it, or feed it to the birds and animals. Frequently a patient is willing to eat, then hesitates because she feels it is not safe, or that there may not be sufficient for her family and herself, so she feels it necessary to save part of the food for them. As a result the patient does not take sufficient food and leaves part of it stored on the window sill, or in cupboards and bureau drawers for the members of the family.

Preoccupation in thoughts and fancies often prevent the taking of food at the proper time. Patients often refuse to eat when they are depressed; they are unwilling to do anything, they have illusions and hallucinations, and at times become destructive with the trays served them. Others take an abundance of food of one type, but refuse variety. They acquire varied positions, at times, while eating. One patient sits on the back of the settee balancing the article of food on her head. Instances of this kind are numerous and careful observation must be made as to food intake. Forced feedings and nourishments are given to make up the requirements. Tube feeding is not encouraged. The patient is given a tray at all meals with the idea that there may be something to appeal to and entice him.

Malnutrition may be characterized by overweight as well as underweight. The idea of eating food regardless of quantity, because one is able to afford it is very prevalent. The obese patient fails to exercise sufficiently and becomes sedentary and lazy in habits.

Constipation, which is frequent with the mental patient, is overcome by serving extra fruits and vegetables rather than by resorting to drug laxatives. The patients that are able to use their judgment and help themselves in these special cases are generally taken care of in the dining rooms. Trays are discouraged as much as possible, excepting in special cases or when the patient is too ill. Groups on the wards at meal time are preferable to isolation.

Malnutrition, therefore, may occur in many despite good food supplies. We may have starvation in the midst of abundance unless given careful and immediate attention.

How can we help in overcoming some of these ideas about food and assist the patient, the doctor, and the nursing service, whose duty it is to care for the patient? I feel that the first step in the very background is a well organized, harmonious dietary department which carries its responsibilities with ease and efficiency. The presence of an esprit de corps in the dietary personnel is essential. One must arouse an interest in them for appreciation of good food standards, pride in their work, loyalty, honesty, thrift, cleanliness and regularity. Developing one's own personnel and giving them the advantages of promotion from within is a good stabilizer. Lack of harmony and confusion should not exist, least of all in a department in a hospital of this type. Such unfavorable reactions are very evident and can easily be projected to other parts of the hospital. Coöperation with all other departments in arranging time and work, and aiding in social functions, is essential. Hospitality, sociability, and agreeable personality are qualities to be recognized in the dietitian and her staff.

The food preparation is important and the excellence varies directly with the amount of supervision provided. The adequate diet is not only essential, but also palatability, attractively prepared and well served food must be considered. There can be no limit to innovations and imagination nor to the initiative and tact one may use.

A pleasant break in the day can be made by the incorporation into the hospital program of certain additions to the ordinary meal routine: teas given in the library or occupational therapy department, afternoon and evening dances, outdoor suppers, picnics on the grounds given for individual groups, classified groups, or the entire hospital. At these outdoor picnics food may be served with a box lunch, or with cafeteria service. With the help of the nursing service and the occupational therapy department, the patient is given a feeling of relaxation and enjoyment. Music, dancing and singing are provided at these times, and such functions have proven very beneficial. Baseball games, tennis matches and card parties are arranged. Here the dietitian may be creative in devising the novelty of service and variations used. The patient is interested in new things and the stimulation of a jaded appetite is very necessary. At a baseball game during the summer the patients were very pleased when the "Good Humor" man came in unannounced to serve them his wares.

Teas, fudge parties, taffy pulls and corn poppings are often held on the wards. All of this has a tendency to establish sociability and often breaks down the barrier and the patient's conception of the hospital and

assists him in giving up erroneous ideas about his food. Special days, holidays, and birthdays are generally observed. Decorations carrying out color schemes, with place cards, special menus, candles, and flowers are used. The patients are given the opportunity of making them in their class work. Very fine work is done because they are interested in doing things with a purpose.

In this way the dietary department contributes toward social ends in relation to other departments; it is highly satisfactory and has done much to encourage sociability and a good feeling between patients. In this way we often learn from the patients and encourage them to express their opinions, gaining much from these opinions and criticisms.

In general, the normal diet is quite similar throughout the hospital. A variation is often made for the individual patient and special articles of food added. The personnel is in close contact with the patient and the question of food is often a basis for conversation. In this contact, if the patient is not satisfied, an avenue for displeasure and a bad mental reaction may ensue.

The surroundings and attractiveness of the dining room affect the patient to a considerable degree. One must create a new atmosphere in these familiar surroundings that will react successfully as an actual change of scene; restfulness and charm are necessary attributes to the success. Individuality may be expressed in the colors used, the choice of curtains, and to complete the picture of gracious living, attractive pottery, copper or brass, or an unusual picture may be added. Finally, a touch of living green, a pot of ivy, a bowl of bulbs, invites and welcomes them. A patient made the remark that her reason for eating after a long period of refusing food was that upon entering the dining room she noticed the flowers on her table and she thought she was at home and began to eat. A single flower well arranged may often be more effective than many poorly grouped.

In discussing the dietetic aspect of treatment, we may obtain suggestions from both patient and doctor. The male patient may express a desire for plain, wholesome, well served food. As a whole, they are not so interested in the delicacies and unusual dishes as the women are. Men become more hungry in the hospital than they did when pursuing their ordinary vocations. Meals could be made more pleasurable for parole patients if they were permitted to give their meal time individual consideration. Over-supervision sometimes hinders patients in enjoying meals. Therefore the persons accompanying them to meals should

be selected for tact and personality. Social conversation in the dining room is encouraged, and sufficient time given to enjoy the meals.

All these conditions, therefore, must necessarily be met, and this can only be accomplished in the hospital when there are harmonious relationships among all the departments concerned with the welfare of the patient.

MODERN PARENT ATTITUDES AND SCIENCE

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One frequently hears the question as to why anything so important as parent education did not develop some centuries before. There are probably two reasons for this. All of the children in large families except the last one received training which was as good as most of our preparental courses, but without the scientific background now included. The second reason may have been the exaggerated emphasis placed on the preparation and serving of food.

The mere thought of the quantity of food served in an earlier day appals the present generation. Its preparation must have taken hours, and the recovery from its consumption hours more. Not only was a great amount of time spent in this preparation and consumption of food, but much effort and time went into the study of such things as the proper method of carving in order that no disgust with poorly carved meat might be felt by the diner.

The modern world looks upon the parent not only as a person who is responsible for the food and housing of the family, but, and more importantly, as a force in the community and as an educator. As the latter, it is essential that she know the best that science has contributed to the knowledge of human behavior and human health and growth. What parents two generations ago would have been interested in correct conditioning? Yet in the field of health nothing is more important. We have long known that the salivary and digestive gland reactions are either positive or negative, in terms of the attitude of the person presenting the foods or other substances that must be swallowed. It is on the attitude and the verbal statements which accompany it that positive or negative reactions are based. The human infant reacts negatively to all strong salt solutions and salty substances, but the adult and older child, through a process of conditioning, frequently brought about by the fact that the substance offered him is considered rare and valuable, will eat such strongly salted substances as caviar.

At the two year level, the Kuhlman intelligence test is passed with a prompt ejection from the mouth of bread soaked in a mild solution of

vinegar. Negative reactions to sour substances are expected in early childhood, yet the older child and the adult eat pickles, vinegar-filled salad dressing, and lemon.

It is not what is offered the child that matters, but the attitude with which it is offered and the conditions that surround the situation in which it is offered. The child may be conditioned against food for which he has positive seeking reactions. It is no uncommon thing, for example, to see children, who have been told while on a diet that if they eat foods not on the diet list they will be made sick, refuse these foods or be made sick by them when all necessity for the diet is over. Had they, on the other hand, been told, "Eat all these foods that you have on the list and this will make you well so that you can eat all these other delicious things," no such conditioning against good food would have occurred.

Conditioning caused by parental discussion of foods in the hearing of the child is all too common. In one family with which the writer is familiar, the parent, in the presence of the children who were being offered spinach, said, "There is only one way to protect the human race from spinach, and that is to cross it with poison ivy." It seemed strange to him that later the child refused to eat this and other similar vegetables.

An amusing instance of conditioning occurred recently. The parent took a strong, healthy twelve-year-old boy to a restaurant for luncheon. When she picked up the menu she said to her son, "What would you like to eat?" To which he replied, "Anything, just so it's not good for me."

It is essential that a parent in the modern world know human drives. It is not in the realm of food alone that this knowledge of the motivation of human activity is necessary, but here it plays a large part. It is a well known psychological fact that to be the center of attention and the cause of excitement is one of the strongest human drives in early childhood, and often long beyond that period. The child may not eat because not to eat gives him the center of the stage. At two years of age the son of a well known man of science had to be persuaded to take each mouthful, and even to chew it. The only thing that he appeared to do by himself was swallowing. After a long period during which the family struggled daily to make him eat, his father gave a demonstration in applied psychology. He told the entire family that the child was not to be urged, and that no conversation was to go on about whether he was eating or not. After ten minutes at the first meal, during which this procedure was being carried on, the little boy said, "I am not eating," to which no reply was made other than a calm, "Is that so?" The little boy left his plate untouched for fifteen minutes more, then picked up his fork and burst out

crying, saying through his sobs, "Nobody pays any attention to me any more when I don't eat."

It is important for the parent to understand these drives, and it is equally important for her to know when the cause of poor food habits is really lack of appetite due to illness, fatigue, insufficient exercise and fresh air, and other well known causes of failure to eat. The parent needs to know during what growth stages finicky habits may tend to appear, and particularly she needs to know and to compensate for those peculiarities of habits that occur during the adolescent period.

The number of scientifically demonstrated facts that the parent must know is large, since they cover the whole field of human behavior, health and growth. But these scientific facts must not, in many cases, simply be handed over without interpretation. They must be in practical terms, adjusted to ordinary parents' knowledge and ordinary home conditions. If no interpretation is made, parents are apt to get as much harm as good from their contact with scientific knowledge.

Such an experiment as that recently carried out to determine the ability of children to choose food that would keep them in perfect health, is excellent from the point of view of the contribution which it makes to the field of nutrition. Were it turned over to parents the result would probably be disastrous, for most children are already more conditioned toward certain foods than toward others, and if left to themselves might well choose sweets and starches at the expense of all other foods. They might choose proteins and leave out all starches, and so on. Self choice of foods can only be carried out where the conditions are completely controlled. In the average home this is impossible. The chief contribution of this experiment to the parent is that it shows clearly that a completely balanced diet need not be consumed at each meal. In fact, if the proper foods are taken over a period of a week, or even more, this is sufficient to keep the child in health. Many feeding problems have been started by the anxiety of the parent that the child eat a completely balanced diet at each meal. If a cereal is not entirely consumed, or if it is refused on one morning, great excitement frequently results. Dr. Hedger has stated that a large proportion of feeding problems have arisen because of the anxiety of the parent to force the child to eat a completely perfect set of foods at each meal. The parental worry resulting from any variation is transferred to the child, and he either feels upset and disturbed over his own poor food reaction, or finds in the food situation a desirable chance to become the center of the stage and to dominate his family.

Parents are as anxious for information as research students are to ex-

plore new fields, but the information must be given them in acceptable terms. Parenthood is an art, but like many other arts, its foundation is in science. The parent is not the first artist to need science, if his art is to function properly. The great Leonardo founded his art on a close study of anatomy and saw no peculiarities in the use of exact measurement. With his calipers he examined the great works of the Greeks and founded not a little of his art on higher mathematics. Parents need even more of science for that most creative of all arts, the care and rearing of children.

EDITORIAL

More Abundant Health

Are there more vitamins? But after their discovery comes the patient study of their function, the strange and often varied symptoms resulting from their absence, the often even more picturesque results when they are present in just sufficient quantity to keep the reagent rats alive. Here the symptoms frequently resemble most closely the human disease associated with that particular dietary deficiency, for example, the more complete development of the nerve symptoms characteristic of beri beri with an inadequate allowance rather than total absence of vitamin B. Sherman[1] has recently called attention to another similar instance—development of the "characteristic" skin lesions of pellagra when experimental animals are supplied a barely life-supporting minimum of vitamin G, newly differentiated from vitamin B. Sherman also states that it appears to him, as to some other investigators, that even the newly differentiated vitamin G is not an entity, but two or more vitamins, at least one of which may carry the growth-promoting function while another protects against the digestive and skin disorders. This possible further separation of vitamins will not, however, reduce the importance of the functions of vitamin G which he so vividly pictures.

Evidence is also rapidly accumulating that, as with vitamins A and C, an allowance of vitamin G much higher than that necessary to prevent symptoms of disease, is an added nutritional advantage toward health and vigor beyond that merely adequate for the necessities of life. That this advantage shows more clearly in the second generation may discourage the dietitian of whom immediate results may seem to be required, but it is additional evidence of the fundamental functions of the composite vitamin G.

Another important contribution that Sherman brings to us from the wealth of his many-sided nutrition experience is a widened conception of the interrelation of nutritional factors. New research emphasizes much interdependence, and suggests the possibility of betterment of an already normal nutrition with improvement to health and longevity.

[1] J. Am. Med. Assoc., Vol. 97, p. 1425, 1931.

The Dietitian and the Follow-up Work of the White House Conference

In an address before the Dietitians' Association of Philadelphia, Dr. Samuel Mc Clintock Hamill pointed out that President Hoover's interest in forming the White House Conference came as a result of his earlier work in Belgium, his continued interest in child welfare, and a belief that more effective work could be done through pooling efforts and coördinating the work of all agencies for the common good of the child. The results of the first conference were well expressed in the March (1931) issue of the *Survey*, where Dr. Haven Emerson wrote

> That meeting will long be remembered as having assembled and expressed a greater body of fact, with its appropriate interpretation and practical application for the individual child, than could have been so related to our needs at any previous time in human history.

As Chairman of the Section on Medical Service, Dr. Hamill has been in a position to know how much work the reports presented involved and to experience the coöperation and witness the spirit of service manifested not only while various aspects of child health were being studied as the basis for the final reports, but also in the more recent attempts to give publicity to the findings and recommendations made to improve child health.

Among the letters from various groups received shortly after the February meeting was one from the President of the American Dietetic Association, Margaret Gillman, in which she said:

> This letter is to assure you of the willingness of the American Dietetic Association to coöperate in the follow-up work of the White House Conference should it be your wish to have our assistance. . . . . At the present time in hospitals considerable health education and nutrition work is being carried on in the out-patient clinics by our dietitians. We feel that in the hospital there is a real opportunity to improve the nutrition of children and adults, and dietitians are just beginning to realize their opportunities in this field.

From his early hospital experience of forty years ago in which the dietitian did not exist, Dr. Hamill in his address traced the progress of the "high class" cook-housekeeper-dietitian to her present development not only as an administrative executive, but also as a far reaching educational agent in teaching nutrition to the nurses, personnel, and medical students of the hospitals, as well as to in-patients and out-patients. In the dietitian's teaching course contact with the nurse, especially the

public health nurse, her knowledge may have wide influence in both urban and rural communities. Through serving better meals and teaching better food habits to the non-medical staff members and employees of the hospital, the dietitian may reach the homes of these respective workers. Through close and continuous coöperation between the doctor, the dietitian, and the medical social service worker, especially in the out-patient department where opportunities are greatest, better service will be rendered to the patient. In the out-patient departments of many hospitals, such as the Children's Hospital, the Babies', Lankenau, and Pennsylvania Hospitals of Philadelphia, and in the prenatal and children's clinics at Jefferson, Presbyterian, and other hospitals in the same city, various educational procedures to teach the value of right foods and proper diets are now carried out with adults and children. This is an added opportunity to teach both adults and children the most accepted nutrition findings of the Conference and to help these patients translate this information into better health habits.

The medical student is being taught nutrition by scientists in the laboratory, and the practical application of the scientist's knowledge by the clinician. It is the dietitian's place to supplement this teaching in an even more practical way. Her instruction must be as accurate and reliable as that given by his other teachers. The Committee on Growth and Development determined at its initial sessions to exclude, insofar as was humanly possible, all material that by the test of practical application could not be accepted as knowledge, therefore the teaching dietitian may safely rely on the Committee's volumes on nutrition for use in her work. At present dietitians are teaching some phase of food or nutrition in Harvard University, Tufts Medical School, the University of Iowa the University of Michigan, Johns Hopkins, the Rush Medical School and other institutions. The extent to which this teaching will be perpetuated and developed depends upon the dietitian's willingness to equip herself to do the work in an effective, reliable manner.

There are so many ways in which the dietitian can coöperate with the Follow-Up Committee that Dr. Hamill hesitates in singling out any one field for especial consideration; however, one will serve as an illustration. As our knowledge of nutrition has expanded, we have learned the great importance to the child of the giving of essential foods to the mother during the period of pregnancy. The development of every structure and every function of the child's body is favorably or unfavorably influenced according to the character of the food intake of the mother. Here is an opportunity to equip oneself with the best information available

and to utilize it in teaching those whose function it is to coöperate with the dietitian in the care of the pregnant woman. This is really one of the fields in which we are failing to apply adequately the knowledge we possess. New procedures are being added to our equipment so rapidly that in our eagerness to try them out we frequently fail to ask ourselves how effectively the well-established procedures—those that the test of experience has shown to be invaluable—are being applied. Dietitians may collectively and individually ask themselves: Are we utilizing all the available knowledge relating to dietietics that will make the work effective? Are we studying the procedures followed in the application of knowledge respecting dietetics to determine whether they are adequate or whether they may not be improved to the benefit of those being served?

We can all be investigators, thinking beyond the mere routine, endeavoring always to add something to the fund of knowledge that may better serve those entrusted to our care.

Estimating Food Costs

Money spent for food in institutions represents a large portion of the total money spent in a fiscal year. During 1931 a committee of the Administration Section did some preliminary work on methods used to compute food costs. As head of this committee, Florence Floore of St. Luke's Hospital, Chicago, sent out questionnaires in an attempt to obtain an estimate of the percentage spent on various types of food. She secured the following data:

TYPES OF FOOD	PER CENT OF TOTAL EXPENDITURE
Meat	18 to 36
Canned fruits and vegetables	7 to 11
Fresh fruits and vegetables	14 to 20
Milk	8 to 16
Butter and cream	10 to 17
Eggs, cheese and nuts	5 to 6
Other fats	1 to 4

The results led the committee to conclude that:

A standard classification of food expenditures would be of great value. As it is, each hospital seems to have its own method of distribution and division and many of the figures sent in could not be compared on this account. If certain hospitals could be selected for a study, beginning for instance, at the first of the year and continuing for six months, we would probably have some very interesting comparisons.

They suggest further that hospitals could be grouped as general, private, county, and children's hospitals.

Helen Gilson, Chairman of the Administration Section, for 1930–31, in commenting on the report, maintained that too many hospitals were figuring food costs by census rather than by the actual number of meals served. She agreed with Miss Floore that there was enough discrepancy in handling these costs to warrant further investigation.

As a result of the questionnaire sent out by Miss Gilson pertaining to food costs the following additional data were obtained: dietitians were whole heartedly in favor of standardized recipes; nineteen did have a food budget, while eight did not have a food budget; in determining the individual selected to calculate the cost of food the dietitian seemed to have been given first preference and the business office personnel second, the work was usually taken care of by the business office personnel in the larger hospitals; eleven hospitals based food costs on meals served, while fifteen used the census. The Committee believed that actual meals served seemed a more accurate method of ascertaining the number fed than by census. The raw food cost per person per meal varied from eight cents in a psychiatric hospital of 1850 beds, to fifty-two cents in a private hospital of one hundred beds.

The study will be continued this year under the direction of the present chairman by a committee for the study of food costs. An analysis of purchases in various types of institutions will be made to determine amounts of various products used and per capita costs. The results of this committee should add materially to the findings of last year. The final summary of practices in common use should be of material assistance to administrators of dietary departments.

CURRENT COMMENT

Annual Report of the Surgeon General of the Public Health Service of the United States, 1931

Among the data presented in this report the following excerpts should be of interest to dietitians.

From 1924 to 1928 there was an increase in the prevalence of pellagra in the United States. In 1929 the reported incidence of the disease decreased somewhat, and there was a further decrease during the year 1930. During the first six months of 1931, however, 16,385 cases of pellagra were reported to the Public Health service, as compared with 13,359 cases reported during the first six months of the preceding year.

Studies in nutrition have consisted largely of the determination of the relative pellagra-preventive potency of single staple food and foodstuffs. A study of canned spinach showed it to contain the anti-pellagric vitamins, but not to a degree sufficient for complete protection against the disease, while canned turnip greens gave complete protection. Canned, green stringless beans were shown to be a relatively poor source of the antipellagric vitamin. The determination of the pellagra-preventive value of canned foodstuffs is of immense practical value, since they may be obtained at the time of the year when the diet is most restricted and pellagra is most prevalent.

In coöperation with the clinical director of the Milledgeville State Hospital, a test of the influence on idiopathic epilepsy of a diet low in the pellagra-preventive vitamin was conducted. It was found that coincidentally with the development of pellagra, there was often a sharp reduction in the number of epileptic seizures, although this returned to its usual level upon recovery from pellagra.

Studies of fatty degeneration of the liver in dogs have been completed, and the results indicate that the condition is probably due to some dietary deficiency.

The studies at the National Institute of Health under the direction of Passed Asst. Surg. W. H. Sebrell have been, in part, a further continuation of the program inaugurated by the late Surg. Joseph Goldberger, of testing individual foodstuffs, particularly in the dog, in order to determine their probable pellagra-preventive value. This work has been supplemented with studies on the antineuritic vitamin and feeding experiments with purified amino acids. During the fiscal year a special report was made of the blacktongue preventive value of Minot's liver extract. The results of this work demonstrated that Minot's liver extract contains the antipellagric vitamin, and therefore would probably be of some value in the treatment of pellagra.

Tests of the blacktongue preventive action of fresh cabbage, lettuce, canned turnip greens, autoclaved cottonseed meal, canned spinach, and rice polishings were completed during the fiscal year.

Tests of canned evaporated milk, collard greens, canned corned beef, navy beans, kidney beans, and Irish potatoes are in progress at the close of the fiscal year.

Studies of the anemia-producing substance in onions were continued, and the results to date indicate that the active material probably resists steam distillation and may be extracted with dilute alcohol.

Studies in the rat led to the development of an intraperitoneal method

of injection of antineuritic concentrates, and the preparation and assay of several antineuritic concentrates was made the subject of a special report. Attempts to develop a satisfactory rat method for determining the presence of the antipellagric vitamin are progressing slowing.

In collaboration with Biochemist M. X. Sullivan and Junior Chemist W. C. Hess, of the Division of Chemistry, studies were begun on the feeding of purified amino acids. It was found that cystine, tyrosine, and glycine in relatively large amounts are toxic to white rats, and that tyrosine and cystine tend to counteract the toxic effects of each other when fed simultaneously. The symptoms of tyrosine toxicity were found to be strikingly different from those of cystine toxicity. A report on the result of these experiments is in course of publication.

There are twenty-two dietitians on duty in the Public Health Service.

In small hospitals the acting chief nurse still acts as dietitian; and when this is the case and the work is satisfactorily performed, the acting chief nurse should have a promotion to chief nurse. It is believed that a dietitian should be placed in every hospital of 100 beds. A chief nurse in a hospital of that size needs all her time for supervision and should not be expected to perform two functions.

A dietitian recently inspected the Marine Hospital at Key West, Florida, and made some valuable suggestions about the conduct of the department there. She also visited the Federal Prison at Atlanta, Georgia, and conferred with the chief medical officer and the chief nurse in regard to the hospital diets in the prison hospital.

Women Trade Commissioners

The December, 1931, issue of *Good Housekeeping* contains an interesting article by Frances Parkinson Keyes on "The Land of the Midnight Sun," in which she gives a vivid picture of Norway and incidentally of a popular member of the American Dietetic Association, Gudrun Carlson.

According to Mrs. Keyes, newcomers very quickly realize that they have arrived at one of the most highly civilized countries in the world;

the country which, for instance, boasts of the lowest infantile death rate—one which puts ours in the United States to shame; the country where illiteracy is almost non-existent; the country which was in the vanguard of the movement for the emancipation of women; the country where seventy per cent of all buildings are supplied with electricity—the largest proportion existent anywhere; the country which distributes the Nobel Peace Price; the country of

of Nansen, of Amundsen, of Grieg, of Sinding, of Ole Bull, of Knut Hamsun, of Sigrid Undset, of Gerhard Munthe.

Among the interesting women Mrs. Keyes met at Oslo she mentions Miss Carlson, who occupies a position there as one of the five women trade commissioners of the United States in foreign countries.

These officials act, to put it colloquially, as American business scouts. They keep their eyes open, study conditions as they change, and are always on the outlook for opportunities for American business. Their reports are sent to Washington, where they are distributed to American manufacturers and exporters. These reports deal with every phase of conditions in the country from which they are sent that might influence American foreign trade; changes in national and municipal taxation; customs duties; tariff changes; fluctuations of exchanges, crop conditions, shipping connections, conditions and changes; general and specific reports on market conditions and general economic conditions. Every event of world importance that might affect the market is considered.

Mrs. Keyes, in outlining the successful work done by Miss Carlson at Oslo mentions her unusual background for her present work, with her Scandinavian heritage, her excellent education, and her wide experience—it was during the six years she represented the Home Economics Department for the Institute of American Meat Packers of Chicago that she was best known to the members of the American Dietetic Association. Miss Carlson has been in Norway for the past three years, and Mrs. Keyes' entertaining article should be of great interest to Miss Carlson's many friends.

BOOK REVIEWS

The Family's Food. By Faith R. Lanman, Hughina McKay and Frances Zuill. Price $1.68. Philadelphia: J. B. Lippincott Company, 1931, pp. 422.

This book is concerned with the food problems of the family of today, offering solutions of these problems based on the wealth of food research literature of recent times. The chief purpose of the book is to bring about improvement in health habits, therefore the selection of food is given greater emphasis than that of preparation, since "everyone has the problem of food selection and not everyone has the problem of food preparation."

The chapter on food habits of the family is very comprehensive, covering the influence of habit on food likes and dislikes, and the resultant dangers. It describes how good food habits may be acquired, with especial emphasis on the development of such habits in very young children.

The chapter on food requirements of the body is written in simple, convincing style, obviously, however, based on reputable information in the field of research. The questions of food for the family group and certain adaptations of the diet to specific conditions are discussed at length. Practically two-thirds of the book is devoted to methods and standards used in the preparation of various foods, including chapters on the modern kitchen, the serving of food, an unusual and engrossing chapter on social customs at the table, one on the pleasures of hospitality, closing with a sane summary of food budgets and costs and an appendix with numerous recipes.

Allergy and Applied Immunology. By Warren T. Vaughan. Price $4.50. St. Louis: C. V. Mosby Company, 1931, pp. 359.

In this volume the chapter on removal of allergins from the diet is of especial interest to dietitians. Suggestions are given for the administration of wheat-free diet, and the avoidance of cottonseed oil, pork, cocoa, milk, eggs, soy beans, cheese and other foods commonly found to be allergic in their reaction. Of interest, also, are the chapters on elimination diets and food diaries. The book is recommended to the dietitian who wishes to use her knowledge of nutrition, food combinations and ingredients to assist the physician in the problem of allergy and applied immunology.

Living the Liver Diet. By Elmer A. Miner. Price $1.50. St. Louis: C. V. Mosby Company, 1931, pp. 106.

This little book is a welcome addition to the growing list of handbooks for the patient. It may be found helpful by the physician, nurse and dietitian as well. Numerous recipes and suggestions for carrying out the "liver diet" are given. The author acknowledges his indebtedness for the assistance and criticisms of Doctors Murphy, Elliot, and Star, and to the Misses Tubbs and Bellinger for their contributions. One turns with assurance to this unique book written by a doctor who was himself necessarily compelled to "live the liver diet."

Simplified Diabetic Management. By Joseph T. Beardwood, Jr., and Herbert T. Kelly. Price $1.50. Philadelphia: J. B. Lippincott Company, 1931, pp. 191.

Drs. Beardwood and Kelly have made an excellent contribution to the seemingly endless list of handbooks on the treatment of diabetes. The introductory chapter is a history and general consideration of diabetes, and is obviously written for the perusal of the patient, yet suitable for the guidance of the physician, dietitian, or nurse in their care and teaching of the patient. The authors' unit method of calculating the diet prescription corresponds to other simple methods now in vogue. The method of calculation of

diets with the percentage system is included. The book may be unique in that it lists a number of calculated and suggested diets for use when diabetes is complicated by other conditions such as peptic ulcer, colitis, etc. These diets were prepared with the collaboration of Elsie M. Watt, formerly dietitian, Diabetic Clinic, Presbyterian Hospital in Philadelphia.

It is regrettable that too little consideration is given to what constitutes a "normal" or optimum diet, in the usual book of this type. Diabetic or not, the patient should have his therapeutic diet calculated as far as possible on the basis of his "normal" requirement of the dietary essentials. It is scarcely enough to know in making up diabetic children's diets, that "they handle the bulky foods and fats poorly, but do better on the more concentrated forms of carbohydrate." Despite this weakness, the book commends itself to those interested in a simple exposition of diabetic therapy.

Manual for the Jewish Diabetic. By William S. Collens. New York: Bloch Publishing Company, 1931, pp. 138.

The foreword of this little book indicates that it was written in response to a need for a diabetic primer that would take into consideration the Jewish palate and dietary laws. According to the author, diabetes is five times as frequent among Jews as among Gentiles. The book aims to be a "simple exposition on the subject of the Jewish diabetic dietary," while also giving the patient sufficient knowledge of his disease. The book as a whole does not differ markedly from certain other handbooks on the subject, but it is unique in that the series of eighteen menus and twenty-three pages of recipes are designed to appeal to the Jewish patient.

A Suggestive Budget for Families of Low Income. Price $.35. Washington, D. C. The Washington Council of Social Agencies, 1931, pp. 52.

This little booklet represents an amazing amount of practical research and should prove invaluable to those called upon to assist families on low incomes, anxious to maintain a decent standard of living. Clyde Schuman, National Director of the Red Cross Nutrition Service was Chairman of the Committee who prepared this revised budget.

CURRENT LITERATURE

KATHLEEN M. LEWIS

American Journal of Diseases of Children

Vol. 42, October, 1931

Basal metabolism in diabetic children. A. Topper.—p. 760.

*Anorexia, loss of weight and capricious appetite. M. Loeber and H. L. Weinberger.—p. 767.

*Growth in height and weight, and retention of nitrogen, calcium and phosphorous during recovery from severe malnutrition. G. Stearns and D. L. R. Moore.—p. 774.

Vol. 42, November, 1931

Calcium and phosphorous metabolism of infants receiving undiluted milk. M. V. Nelson.—p. 1090.

*Undulant fever in children. E. D. Anderson and J. F. Pohl.—p. 1103.

Allergic migraine in children. R. M. Balyeat and H. J. Rinkle.—p. 1126.

Seasonal variation in the antirachitic effect of sunshine. F. F. Tisdall and A. Brown.—p. 1144.

Vol. 42, December, 1931

The nutrition of twins on a vegetable diet during pregnancy, the nursing period and infancy. D. E. Lane.—p. 1384.

Vol. 43, January, 1932

Human milk studies. A comparison of the composition of the milk from the two breasts. M. Brown, I. G. Macy, B. Nims and H. A. Hunscher.—p. 40.

Avitaminosis and blood clotting function. N. Kugelmass and E. L. Samuel.—p. 52.

Effect of curd tension on the digestibility of milk. D. L. Espe and J. A. Dye.—p. 62.

Anorexia, loss of weight and capricious appetite. In cases where no pathological condition has been found, gastric analysis and examination of stool have proved very valuable. They have been of great service in discovering causes of anorexia, loss of weight and capricious appetite. In conjunction with gastro-analysis, the examination of stool, vomitus, and roentgenograms has resulted in: the finding of duodenal and gastric ulcers; the diagnosing of the condition of spastic constipation showing hypoacidity as outstanding feature of failure to gain; and the examination of stools of hyper-acidic patients showed increased indigestion of starch and increased indigestion of fats.

Growth in height and weight, and retention of nitrogen, calcium and phosphorus during recovery from severe malnutrition. A study was made of growth in height and weight and in calcium, phosphorus and nitrogen retention of a three and one-half year old child, during her recovery from severe diarrhea and malnutrition with the following results: gain in weight before gain in height; once started, gain in height rapid; nitrogen retention during weight increase greater than has been reported for infants during most rapid growth; retention of calcium as large as that reported in growing infants; retention of calcium as large during period before growth in height had begun, as during period of greatest growth in height; retention of phosphorus corresponded well with that amount which could be calculated as necessary to combine with the amount of calcium and nitrogen retained.

Undulant fever in children. Today evidence indicates that there is a definite relationship between the disease known as abortive fever, which occurs in cattle and hogs, and the disease known as undulant fever, which occurs in man. There appears to be sufficient evidence to prove that persons may become infected by drinking raw milk from cows that have had abortive fever, though the incidence of undulant fever among people drinking infected milk is comparatively low. While the majority of reported cases have occurred in adults,

children are not immune. Three cases in children ranging from 3 to 8 years were submitted. The parents in each case were unaware that the child was ill except for the persistent fever—which suggests that the disease must be of a more frequent occurrence than is believed, and that in many cases, it runs its course unsuspected.

American Journal of Physiology

Vol. 98, November, 1931

Studies in gastric secretion. Evidence in refutation of the Rosemann theory of hydrochloric acid formation. F. Hollander.—p. 551.

The influence of physical training on the basal metabolic rate of man. E. C. Schneider and A. O. Foster.—p. 595.

The basal metabolism of Oklahoma women. C. M. Coons.—p. 692.

*Basal metabolism in relation to nutritional status. C. M. Coons.—p. 698.

Vol. 99, December, 1931

*The effect of a diet of polished rice on the mineral content of the carcasses of pigeons. J. S. McHargue and W. R. Roy.—p. 221.

Vol. 99, January, 1931

An accessory regulation of acid-base equilibrium and pulmonary ventilation by virtue of the lactic acid changes in the liver. G. S. McClure.—p. 365.

The influence of diet and the anterior pituitary growth hormone on the growth rate of adolescent rats. A. H. Bryan and D. W. Gaiser.—p. 379.

Hypertrophy of the gastro-intestinal tract and high residue diets. T. Addis.—p. 417.

Testicular degeneration due to inadequate vitamin A in cases where E is adequate. H. M. Evans.—p. 477.

Basal metabolism and nutritional status. Data was submitted on 38 overweight and 80 underweight college women ranging in age from 17 to 28 years and in weight from minus 29 to plus 102 per cent. The overweight women tended to metabolize at a higher rate and the underweight at a lower rate, whether expressed as total calories, calories per centimeter or calories per square meter. The reverse was true when heat production was expressed as calories per kilogram. The effect of undernutrition and overnutrition tended to manifest itself even when the weight varied between 10 and 15 per cent above or below the average. The magnitude of the basal metabolism tended to increase with the weight variation, but not in the same proportion.

The effect of a diet of polished rice on the mineral content of the carcasses of pigeons. The purpose of the experiment was to learn whether or not a diminution of one or more of the mineral constituents of the ash of the carcasses of pigeons would occur when they were brought down with experimental polyneuritis by feeding polished rice. The analysis of their carcasses showed marked diminution in magnesium, phosphorus and potassium as well as in some of the minor constituents. Unpolished rice, wheat and yellow corn cured polyneuritis and restored normal body weight, showing that they contained factors B_1 and B_2 (responsible for increase in body weight). Barley, rye and white corn contained vitamin B_1, but were deficient in vitamin B_2. Wheat, unpolished rice, and yellow corn contained more of the elements, copper, manganese and iron, than barley, white corn and rye, which leads to the conclusion that the minor mineral constituents as well as calcium, magnesium, phosphorus, and potassium are factors in protecting pigeons from polyneuritis.

American Journal of Public Health

Vol. 21, October, 1931

Sanitary control of shellfish in the state of Washington. H. W. Nightingale.—p. 1107.

Vol. 21, November, 1931

An epidemiological study of suspected water-born gastro-enteritis. M. V. Veldee.—p. 1227.

Vol. 21, December, 1931

*Food poisoning following the eating of codfish cakes. E. Kellert.—p. 1352.

*Work environment as a factor in the general health of workers. B. J. Newman.—p. 1354.

Food poisoning following the eating of codfish cakes. When samples of codfish cakes which had caused gastrointestinal symptoms in a family, were tested by a bacteriologist, their smears showed gram positive cocci and gram negative bacilli. Cultures on blood agar yielded many colonies

of streptococci of the viridins type, and a gram negative bacillus. Many foods may become contaminated and give rise to food poisoning such as this.

Work environment as a factor in the general health of workers. In order to do scientific research in the problem of health among workers, the scientist must make a thorough study of the home conditions of the employee. So called "industrial fatigue" not only arises in the plant, but is a compound of plant activities and home conditions. Industry can exert its influence on safe, wholesome living by establishing and giving adequate publicity to an employment policy which gives preference to those workers who have shown an intelligent self interest in avoiding occupancy of substandard dwellings or areas.

American Restaurant Magazine

Vol. 14, October, 1931

What to serve when they take the family out to dine. H. Ewing.—p. 59.
Market conditions. H. R. White.—p. 64.

Vol. 14, November, 1931

*Has the American public forgotten how to eat? A. H. Buck.—p. 24.
Trends in food merchandising. E. M. Fleischman.—p. 36.
*Methods and solutions of employee relationships. L. G. Sanborn.—p. 35.
Market conditions. H. R. White.—p. 63.

Vol. 14, December, 1931

Planning the Christmas meal. H. Ewing.—p. 25.
Market conditions. H. R. White.—p. 36.
*Food fit for kings. H. C. Siekman.—p. 37.

Vol. 15, January, 1932

Food for the hurried traveler. W. J. Miskella.—p. 33.
Restaurant operating costs. Horwath and Horwath.—p. 34.
Meeting the unexpected menu load. H. Ewing.—p. 37.

Has the American public forgotten how to eat? Truthful advertising will encourage the public to think conservatively about food, and teach them to eat proper quantities at proper times.

Methods and solutions of employee relationships. Sympathy and understanding without familiarity, and reward through increased wages and responsibility where it is due, is the ideal condition between employer and employee. Personal training and supervision by the manager or assistant will result in maintenance of the standard of the organization.

Food fit for kings. Essential to the success of a restaurant are attractive and appealing innovations to please the palates of its patrons. An example is "Grissini" or bread-sticks served regularly in Jacques restaurant in Chicago, and are a characteristic for which that restaurant is famous.

Archives of Pediatrics

Vol. 15, February, 1932

The mysteries of deep fat frying revealed. F. J. Coughin and M. B. Peterson.—p. 30.
Consider the balanced appetite. H. Ewing.—p. 35.

Vol. 48, November, 1931

*The relationship of growth and development to abnormalities of dentition. I. A. Abt.—p. 705.
Diarrhea: summer complaint. E. B. Hardisty.—p. 719.
Chronic interstitial nephritis in children. R. R. Scobey.—p. 738.

The relation of growth and development to abnormalities of dentition. Such factors as mouth breathing, thumb sucking, heredity, the endocrine gland system, syphilis and nutrition are considered of major importance in the causation of abnormalties in dentition. Normal skeletal growth depends in no small part upon healthy function of the glands of internal secretion. Production of normal teeth is greatly dependent upon the proper quantity, quality of foods and accessory food stuffs such as vitamins in order that growth and development may proceed normally and preservation be assured. Strong durable teeth are the index of normal growth, proper nutrition and healthy development.

Hotel Management

Vol. 20, November, 1931

Close, personal supervision is the answer to dining room profits. S. Beer.—p. 195.

How the Savarin restaurants plan for durability and efficiency in service. W. L. Cook.—p. 199.
*Giving the public what it wants means catering to its new eating habits. F. Bucher.—p. 212.

Vol. 20, December, 1931

*This comprehensive system saves both dish breakage and waitresses' time. M. M. Morse.—p. 254.
Improved methods and constant supervision reduce operating expense. B. C. Reber.—p. 270.

Vol. 21, January, 1932

This comprehensive system saves both dish breakage and waitresses' time. M. M. Morse.—p. 13.
How to increase food sales through color harmony appeal. A. Easton.—p. 18.

Giving the public what it wants means catering to its new eating habits. It should be the aim of restauranteurs to satisfy the greatest number of people. The demands of the public have changed due to: prohibition; increase in women patronage; advice of doctors, dentists and dietitians; shorter working hours; college trained women employed; automobiles; hotel and trade press; better refrigeration, food cost and accounting. The demand for quantity is disappearing—quality, good taste and attractiveness are the trump cards today. "Study your problem and put your heart, personality, artistic ability into your profession."

This comprehensive system saves both dish breakage and waitresses' time. Efficiency in stacking dishes saves time and breakage. When the dishes are properly stacked the unloading is more orderly and there is less breakage. The arrangement of dishes on the tray depends upon the best method that can be made for safe and quick unloading. Breakage is saved by the saving of time.

Hotel Monthly

Vol. 39, October, 1931

*The S. S. Empress of Britain.—p. 27.
Tour of Hall's china plant.—p. 70.
Shircliffe's menu suggestions for November.—p. 80.

Vol. 39, November, 1931

*The Savoy, pioneer luxury hotel.—p. 27.
Short history of restaurant industry.—p. 42.
Suggestions for December menus.—p. 87.

Vol. 39, December, 1931

*The Dorchester, a luxury hotel.—p. 26.
Shircliffe's menu suggestions.—p. 84.

Vol. 40, January, 1931

The Waldorf Astoria.—p. 21.
In Oscar's realm.—p. 47.
Vegetable chart for menu makers.—p. 59.

The S. S. Empress of Britain. A pictorial exposition is shown of the first and tourist cabin lounges, the library, main dining room, a hospital ward and the all electric kitchen—with typical menus. The article also includes plans of apartments, kitchens and laundry with a detailed description of a tour of the kitchens.

The Savoy, pioneer luxury hotel. A descriptive tour of a hotel which gives a service that practically anticipates every rational need of its guests is outlined. The tour includes public rooms, dining rooms and bars.

The Dorchester, a luxury hotel. The reception of visitors in one of London's most ideally located hotels is charming and delightful. A detailed description of the kitchens and bake shop is also given.

Hospital Topics

Vol. 9, November, 1931

Dietitians complete responsibility stressed at recent meetings. A. E. Boller.—p. 80.

Vol. 9, December, 1931

Christmas on the wards. D. Ketcham.—p. 15.
*The art and science of menu planning. A. E. Boller.—p. 40.

Vol. 10, January, 1932

The ins and outs of menu-making. A. E. Boller.—p. 56.

The art and science of menu planning. The dietitian's problem in planning menus is to meet the nutritional requirements of the various groups to be served, within certain cost limits, and yet include several variations of food and new combinations so that meals do not become monotonous. Standard weekly menus, though not objectional to patients who are in the hospital a

short time, are not desirable for the patient forced to stay longer or for the hospital personnel. A correlated menu between the private room, semi-private, ward, nurses, doctors and employees simplifies the work of the purchasing department, is labor saving in many instances and the use of left overs is much easier. The most skillful medical care and most efficient nursing may be overlooked by a patient who has been displeased with the meals served him during hospitalization.

Journal American Medical Association

Vol. 97, October 3, 1931

*The anemias of infancy and early childhood. L. G. Parsons.—p. 973.
Allergic and infectious conditions of upper respiratory tract in children. M. B. Cohen and J. A. Rudolph.—p. 980.
Pernicious anemia complicated by acute miliary tuberculosis. W. Freeman.—p. 996.

Vol. 97, October 10, 1931

*Source and rôle of urinary protein in nephritis. W. A. Thomas.—p. 1055.
*The treatment of obesity with low caloric diets. F. A. Evans and J. M. Strang.—p. 1063.
Will the physician prescribe the diet? J. A. Marshall. —p. 1072.
Preparation of beef juice in prevention of beef tapeworm infestation in children. I. M. Levin and I. Pilot.—p. 1074.

Vol. 97, October 24, 1931

Principles of diagnosis and treatment of allergic diseases. A. F. Coca.—p. 1201.

Vol. 97, October 31, 1931

*Hypertension—the value of calcium salts plus diet in its management. N. S. Davis.—p. 1265.

Vol. 97, November 14, 1931

*Some recent advances in the chemistry of nutrition. H. C. Sherman.—p. 1425.
Gastro-intestinal allergy. A. H. Rowe.—p. 1440.

Vol. 97, November 28, 1931

Rectal and anal injuries from certain foods and ingested foreign bodies. D. C. McKenney.—p. 1612.
Allergic epilepsy. S. J. Levin.—p. 1624.

Vol. 97, December 5, 1931

Cause of obesity. L. H. Newburgh.—p. 1659.
Staphylococcus food poisoning. E. O. Jordan.—p. 1704.
Hyperinsulinism. H. J. John.—p. 1708.

Vol. 97, December 26, 1931

*Salt-restricted dietary with particular application to tuberculosis therapy. E. Mayer.—p. 1935.

Vol. 98, January 3, 1932

Food and nutrition in the depression period. Editorial.—p. 50.

Vol. 98, January 9, 1932

Occupational dermatitis due to lettuce. H. J. R. Rinkel and R. M. Balyeat.—p. 137.

Vol. 98, January 16, 1932

Relationship of vitamin A to respiratory infections in infants. L. H. Barenberg and J. M. Lewis.—p. 199.
The progress of nutrition as a science.—p. 234.

Vol. 98, January 23, 1932

Fat tolerance in experimental hyperthyroidism. J. P. Simonds and O. E. Helpler.—p. 283.
Nutritional anemia. Editorial.—p. 320.
The antiscorbutic potency of some citrus fruits. Current comment.—p. 323.

The anemias of infancy and early childhood. Anemia may be due to a defect of nutrition, infection, abnormal infection, abnormal hemolysis or a combination of one or two of them. A nutritive defect may be caused either by an insufficient diet or by a constitutional defect. Most cases of constitutional anemia in infants are found in premature babies and twins, which leads to the belief that at birth there is a lack of substances which will aid in synthesizing hemoglobin. A correct diet and proper care are efficient in setting up normal metabolic processes at least after the second year. Milk feeding beyond a normal weaning period apparently leads to nutritional anemia. Anemia is associated with intestinal infection, but few cases show anemia as a result of the infection. Chronic urinary infections seem to cause anemia due to the long continued milk diet; therefore after healing of the infection there is an improvement in the blood count. Apparently there is no relation between hemolysis at birth and nutritional anemia.

Source and rôle of urinary protein in nephritis. The theory in nephritis has been that the kidney was unable to excrete water and salts properly, due to degeneration or inflammation, but kept them in the blood.

It is now believed that the tissues are responsible for the proper excretions of the kidney. If a balance is maintained which will allow the tissues sufficient water and salts, the remainder will be excreted. Experiments on dogs have shown that the kidneys excrete foreign protein and the conclusion has been that whether the kidney is normal or damaged it will excrete foreign proteins and retain in the circulation those proteins necessary to the body.

The treatment of obesity with low caloric diets. Obesity is due to excess fat stored in the tissues. The removal of this fat with the consequential loss in weight is possible only when the energy output is greater than the energy intake. With the adequate amount of protein and the necessary vitamins, weight may be lost without detriment to the body or health. Experiments have proved that one gram of protein per kilogram of body weight, 0.6 grams or carbohydrate per kilogram of body weight, and no fat except that which is already in the food is enough to allow the body to function properly and yet reduce the amount of excess fat. Patients adhering to these diets found that they felt better physically and mentally, although the loss in weight was not great in all cases. While thyroid extract will cause a weight reduction, due to the increased energy output, it is considered dangerous in most cases because it increases nitrogen metabolism and impairs the necessary balance for the proper functioning of the normal individual. A very small percentage of cases did not lose weight by the diet alone and a regulated amount of thyroid extract was given.

Hypertension: the value of calcium salts plus diet in its management; a possible classification and a historical perspective. Davis used calcium lactate in the treatment of hypertension on the basis that if it prevented tonic spasms in skeletal muscle, it might also do so in arterial muscle. A low salt, low protein diet was used in conjunction with it. Though the patient felt better, the results, as indicated by blood pressure curves, were not conclusive. For successful treatment the underlying causes of the disease must be more thoroughly understood.

Some recent advances in the chemistry of nutrition. Sherman has found that vitamin G deficiency is a condition that can be produced experimentally, but the condition produced is not unanimously agreed to be pellagra. However, a high vitamin G intake contributes to good nutrition. A better knowledge of the interrelation of the various factors concerned in the latter is necessary. For example, vitamin D influences the intermediary metabolism of calcium, but does not affect the quantity of calcium with which the body must be supplied. Though the calcium supply may be sufficient for storage, it frequently is not sufficient for optimal storage. There are no definite outward signs but in the adult weaknesses in various respects are probably connected with it. To produce optimal nutrition the interrelation of the various nutritional factors and the optimal quantities of each must be known.

The cause of obesity. Newburg refutes the theory of internal disease as a cause of overweight. He emphasizes the need of accurate measurement of total heat production and of water exchange in studies on this subject. The basic cause of all obesity is simple overeating.

Salt-restricted dietary. In this question of the mineral salt metabolism, it is possible that certain constitutions will react favorably to the withdrawal of table salt. It is also equally possible that some individuals will improve on a larger vitamin intake, the two factors correlating in some way biochemically. However, any scheme of the dietary therapy for all constitutions must be rejected. A universally curative treatment for tuberculosis does not exist, but the resistance of inferior constitutions and of defective or deficient organic functions can be raised by correct dietary treatment, and the raising of this resistance represents the favorable aspect of these new endeavors.

Journal Biological Chemistry

Vol. 93, October, 1931

*Further studies on the metabolism of Eskimos. P. Heinbecker.—p. 327.

Distribution of sugar in normal and diabetic blood, and a comparison of the direct and indirect methods of measuring the corpuscle sugar. J. R. Spannutti and M. H. Power.—p. 343.

*The effect of large doses of irradiated ergosterol upon nitrogen, calcium and phosphorous metabolism in rats. R. Kern, M. F. Montgomery and E. V. Still.—p. 365.

The effects of high and prolonged magnesium lactate intake upon the metabolism of magnesium and calcium in man. H. E. Carswell and J. E. Winter.—p. 411.

Clinical calorimetry. Prolonged meat diets with a study of the respiratory metabolism. W. S. McClellan, H. J. Spencer and E. A. Folk.—p. 419.

*The effect of artificial drying upon the vitamin A content of alfalfa. S. M. Hauge and W. Aitkenhead.—p. 657.

The growth promoting properties of the concentrated water soluble portion of milk. G. C. Supplee, O. J. Kahlenberg and G. E. Flanigan.—p. 705.

Vol. 94, November, 1931

The source of excess calcium in hypercalcemia induced by irradiated ergosterol. A. F. Hess, H. R. Benjamin and J. Gross.—p. 1.

*Studies in the nutritional anemia of the rat. Influence of iron upon blood regeneration. H. H. Beard and V. C. Myers.—p. 71.

*Studies in the nutritional anemia of the rat. Influence of iron plus supplements of other inorganic elements upon blood regeneration. V. C. Myers and H. H. Beard.—p. 89.

Studies in the nutritional anemia of the rat. The prevention of anemia by means of inorganic elements. H. H. Beard, C. Rafferty and V. C. Myers.—p. 111.

Feeding experiments with mixtures of highly purified amino acids. The inadequacy of diets containing nineteen amino acids. W. C. Rose.—p. 155.

Feeding experiments with mixtures of highly purified amino acids. The supplementing effect of proteins. R. H. Ellis and W. C. Rose.—p. 167.

*Studies on the antineuritic vitamin. W. Freudenberg and L. R. Cerecdo.—p. 207.

Factors determining the ergosterol content of yeast. Carbohydrate sources. O. N. Massengale, C. E. Bills and P. S. Prickett.—p. 213.

A study of phosphorous distribution in rat striated muscle as influenced by age, diet and irradiated ergosterol. V. V. Cole and F. C. Koch.—p. 263.

Vol. 94, December, 1931

Mineral metabolism during involution of simple goiter. E. J. Baumann, S. Kurland and N. Metzger.—p. 383.

*The acid-base balance in animal nutrition. The effect of long continued ingestion of acid on reproduction in swine, rats and rabbits. A. R. Lamb and J. M. Evvard.—p. 415.

*The preparation of vitamin C concentrates from lemon juice. J. L. Svirhely and C. G. King.—p. 483.

Vol. 94, January, 1932

The acidic property of sugars. F. Urban and P. A. Shaffer.—p. 697.

Irradiated milk: the energy requirements for antirachitic activation. G. C. Supplee, M. J. Dorcas and A. F. Hess.—p. 749.

The antineuritic vitamin. The method of assay, concentration of the vitamin with silver under various conditions, and its solubility in certain organic solvents. R. J. Block, G. R. Cowgill and B. H. Klotz.—p. 765.

Further studies on the metabolism of Eskimos. Normal Eskimo subjects were found to develop a very mild ketosis during a short period of fasting. The basal metabolism of these Eskimo subjects was found similar to that of persons living on such a diet in temperate zones. The small degree of ketosis and the low respiratory quotients obtained during fasting are interpreted as indicating that Eskimos are able to oxidize fats more completely than ordinary persons. It is thought that respiratory quotients below 0.7 may indicate the existence of some intermediary metabolism such as the conversion of protein or fat to carbohydrate.

The effect of large doses of irradiated ergosterol upon nitrogen, calcium and phosphorus metabolism in rats. Growing rats receiving large daily doses of irradiated ergosterol were found to accumulate much calcium in the kidneys. The disposition to such calcium accumulation was found to be much greater in the female than the male. Irradiated ergosterol in large doses increased the absorption of calcium from the intestine. The excretion of calcium in the feces decreases and the excretion in the urine is greatly increased. To a lesser degree there is also a diminished fecal elimination of phosphorus. It is concluded that since

ergosterol irradiated in alcohol produces greater disturbances in calcium metabolism of growing rats than either ergosterol dry or irradiated in ether, the medium in which the ergosterol is irradiated plays an important part in the development of toxicity. The urinary nitrogen was normal, being affected mainly by the food intake. Analysis of the leg bones of rats fed large amounts of irradiated ergosterol show normal contents of calcium and phosphorus.

The effect of artificial drying upon the vitamin A content of alfalfa. Artificial drying tends to preserve the vitamin A content of alfalfa while the field curing process is considerably destructive to vitamin A. High temperatures, such as are used in mechanical drying (either heated air or hot flue gas, are not responsible for the destruction of vitamin A and during the field curing process the sun's rays (ultra-violet) are not responsible for the destruction of vitamin A. Conditions which favor enzyme activity, such as were encountered in the field curing process, tends to lower the vitamin A value in alfalfa, while conditions adverse to enzyme activity, as in the mechanical drying process, tend to preserve vitamin A.

Studies in the nutritional anemia of the rat. 1. Influence of iron upon blood regeneration. Nutritional anemia in young rats fed on whole milk diets is an inorganic iron deficiency disease, from the time of weaning until about 100 grams of body weight is reached. Since inorganic iron, *per se*, prevents and cures this condition, it seems unnecessary to assume that any other factors in addition to iron, either inorganic or organic, are necessary for hemoglobin formation in this particular type of anemia, although traces of many other elements do have a supplementing (catalytic) action on small amounts of iron.

Studies in the nutritional anemia of the rat. 2. Influence of iron plus supplements of other inorganic elements upon blood regeneration. Hemoglobin and red blood cell regeneration in nutritional anemia can be either prolonged, hastened or obtained in six weeks, depending upon the dosage of the element used as the supplement to 0.5 mg. of iron. Copper, nickle, germanium, manganese, arsenic, titanium, zinc, rubidium, chromium, vanadium, selenium, and mercury, each fed separately in the proper doses with 0.5 mg. of iron, brought about hemoglobin regeneration in two to three weeks and erythrocyte recovery in two, to two and one half weeks, as compared with six to eight weeks, on this amount of iron alone. Iron is essential for hemoglobin regeneration in nutritional anemia and the action of the other elements is probably catalytic in nature.

Studies on the antineuritic vitamin. 1. On the use of albino mice as test animals for determining the potency of antineuritic concentrates. A potent antineuritic concentrate has been obtained from rice polishings, with Jansen and Donath's method of isolation. This preparation cures polyneuritis and promotes growth in mice in daily doses of 0.025 mg. The results show that mice may be used with advantage as test animals for evaluation of antineuritic concentrates.

The acid-base balance in animal nutrition. Swine were fed for three generations (3½ years) on a ration containing 200 to 300 cc. of normal sulphuric acid solution per day. No deleterious effects on growth, well being, reproduction or composition of bones were observed. Three generations of rats, fed with a ration containing 15 cc. of normal acid solution per 100 grams of feed, showed no apparent ill effect. Rabbits tolerated a ration with a net acidity up to 5 cc. of normal acid solution per day, above 5 cc. they soon succumbed. These animals excreted nearly all of the acid as acid phosphate in the urine.

The preparation of vitamin C concentrates from lemon juice. Details have been marked out for the preparation of active fractions of vitamin C from volumes of lemon juice up to 2.5 litre. The vitamin has been shown to be soluble in petroleum-ether acetone, petroleum-ether butyl alcohol, petroleum

ether-propyl alcohol, ethyl acetate, butyl alcohol and prophyl alcohol, but insoluble in absolute ethyl ether. The vitamin, dissolved in organic solutions, is destroyed by ammonia gas. The most concentrated preparations obtained are sufficiently stable to be kept for weekly feeding periods, their active element being distinctly acidic, with a strong reducing action.

Journal Home Economics

Vol. 23, October, 1931

Abstracts of papers on food and nutrition, twenty-fourth annual meeting, American Home Economics Association.—p. 974.

Vol. 23, November, 1931

The relation of acid-base balance of the ration to the growth and reproductive functions of the rat. H. S. Mitchell and L. Miller.—p. 1043.

The cooking of food with heat generated by the resistance of food to the passage of an alternating electric current. L. E. Sater.—p. 1050.

Vol. 23, December, 1931

Food supplies and consumer's habits. W. A. Sherman.—p. 1103.

Accuracies and refinements in standardization. C. B. Sherman.—p. 1114.

Composition of rabbit meat. H. R. McMullin.—p. 1149.

Vol. 24, January, 1932

The pecan nut as a source of vitamin A. H. Levine.—p. 49.

Vol. 24, February, 1932

Definitions of terms used in meat cookery. J. S. Willson.—p. 129.

Journal of Nutrition

Vol. 14, November, 1931

*Studies on lactation. Production of milk in the dog as influenced by different kinds of food proteins. R. G. Daggs.—p. 443.

*The value of the oyster in nutritional anemia. H. Levine, R. E. Remington and F. B. Culp.—p. 469.

The utilization of the iron of protein foods by the albino rat. (A) A comparison of the growth and the iron assimilation as affected by different protein foods. (B) A comparison of protein foods supplementary to milk as sources of iron in nutrition. R. C. Miller and E. B. Forbes.—p. 483.

Vol. 5, January, 1932

Mineral exchanges of man. Effect of excess potassium and of calcium on two normal men and on an edematous nephritic. S. H. Bassett, C. A. Elden and W. S. McCann.—p. 1.

Protein intake and basal metabolism of college women. R. A. Hetler.—p. 69.

Egg yolk proteins. T. H. Jukes and H. D. Kay.—p. 81.

Studies on lactation-production of milk in the dog as influenced by different kinds of food proteins. Diets made up of 30 per cent protein, 25 per cent fat, 40 per cent carbohydrate and 6 per cent ash, furnishing 0.7 to 0.8 grams of nitrogen per kilogram, and 75 to 80 calories per kilogram, and containing all known vitamin and mineral essentials, were fed to Boston bull females. The only variable in the diets was the source of protein—beef liver, round, kidney and egg. The experimental diet was fed from the time of conception through the fifth week of lactation; the litters were all limited to three pups and the mothers given identical care. The conclusion that liver is the best source of protein for milk production in dogs, is borne out by the quantity of milk produced, its fat content, the nitrogen retention and the shape of the growth curve of the pups.

The value of the oyster in nutritional anemia. A review of literature revealed that the oyster, besides being a good source of vitamins A, B, C, and D, contains rather high concentration of various inorganic elements, of which all except iodine have been studied in nutritional anemia. The amounts of iron, copper, zinc, lead, arsenic, and iodine contained in the oyster have been determined by several investigators. The presence of these several elements again suggested that the oyster might be a potent anti-anemia food, and hence the present study was undertaken. Since in addition to Fe, Cu and Mn, other elements—Zn, Pb and As are present, the effectiveness of the oyster with a solution containing equivalent amounts of Fe, Cu and Mn alone was compared. By this procedure it was reasoned that if elements other than Fe, Cu and Mn play a rôle in blood regeneration, then the oyster would be much more effec-

tive than the solution of the three inorganic elements. In addition, an acid solution of oyster ash was fed for comparative purposes. It was expected that the results of this experimental plan would throw further light on the existing controversy as to the elements concerned in blood regeneration in nutritional anemia.

Modern Hospital

Vol. 37, November, 1931

Translating food economics into simple terms of service. M. M. Harrington.—p. 77.

How a large country hospital runs its Dietary Department. M. E. Kalsem.—p. 85.

*Paving the way for a satisfactory food service. K. M. Thoma and H. Smith.—p. 134.

Vol. 37, December, 1931

*Analyzing and inspecting the weekly food bill. K. M. Thoma and H. Smith.—p. 134.

Paving the way for a satisfactory food service. The dietary department may be defined as one that has complete charge of food in all its phases, the supervisior of which has the status of a department head. The dietitian should be in charge of the preparation and distribution of food from the time it arrives in the hospital until it is actually delivered to the patient's bedside. Therefore she must be in complete charge of all employees having to do with the preparation and distribution of the food to the local diet kitchens. By working in close coöperation with the purchasing agent she may accomplish many food economies. She must also work with the administrator and both be constantly alert to the needs and demands of the patients for food service.

Analyzing and inspecting the weekly food bill. The dietary department must have a definite budget which covers personnel, equipment replacement, supplies and food. The first budget in a department that has previously had none should be based on past experience. The food budget which in most hospitals represents about 25 per cent of the total annual dietary expenditures requires not only the greatest individual attention but requires the greatest continuing interest on the part of all concerned. A weekly food meeting is suggested between administrator, dietitian and purchasing agent in which the main subject matter is the presentation and discussion of the previous week's food experience in terms of dollars and cents and in terms of consumption. The figures should compare within reasonable limits to the weekly food budget and when these are inspected in detail each week there will arise no serious conflictions between the dietitian and the administrator regarding excessively high food bills.

NEWS NOTES

The American Dietetic Association. The Business Office has been moved from its old address to Room 821, 185 North Wabash Avenue, Chicago.

It has been decided to hold the 1932 Convention in New York City, November 7–11, at the Hotel Pennsylvania.

The following list of non-affiliated state dietetic associations and local dietetic associations is complete as far as is known. The Business Office staff will appreciate it if members will notify them of any other associations that are in existence. Please send a membership list, names of present officers, date of annual meeting, etc., to Miss Lenfest at Room 821, 185 North Wabash Avenue, Chicago.

Non-affiliated state dietetic associations:

Missouri Dietetic Association.
Rhode Island Dietetic Association.
Tri-State Dietetic Association (Tennessee, Arkansas, Mississippi).
Porto Rico Dietetic Association.

Local dietetic associations:

Atlanta Dietetic Association.
Baltimore Dietetic Association.
Southern California Dietetic Association.
Santa Barbara Dietetic Association.
San Jose Peninsular Dietetic Association.
Northern California Dietetic Association.
Chattanooga-Hamilton County Dietetic Association.
Chicago Dietetic Association.
Des Moines Dietetic Association.
Ann Arbor Dietetic Association.
Battle Creek Dietetic Association.
Detroit Dietetic Association.
Grand Rapids Dietetic Association.
Milwaukee Dietetic Association.
Minot Dietetic Association.
Kansas City Dietetic Association.
St. Louis Dietetic Association.
Nebraska-Western Iowa Dietetic Association.
Central New York Dietetic Association.
Greater New York Dietetic Association.
Rochester Dietetic Association.
Cincinnati Dietetic Association.
Cleveland Dietetic Association.
Dayton Dietetic Association.
Western Pennsylvania Dietetic Association.
Scranton Dietetic Association.
Philadelphia Dietetic Association.
Salt Lake City Dietetic Association.
Richmond Dietetic Association.
Tidewater Dietetic Association.

Social Service Section. An interesting summary of a piece of work undertaken in the Social Service Section under the direction of Laura Comstock, on the feeding of indigent school children in 1930 and 1931 has just been received. This outline is a summary of reports received from eighty-four cities, and was prepared by a sub-committee headed by Vera Stemple. According to Miss Comstock, a copy of the summary may be secured by writing to the Business Office of the Association in Chicago.

Memorial to dietitians who served in the World War. The unveiling ceremony was held under the auspices of the American Red Cross at Washington, D. C. Clyde B. Schuman, National Director of the Nutrition Service of the American Red Cross, presented the presiding officer, Lenna H. Cooper. Mrs. Mary de Garmo Bryan spoke on "The Overseas Dietitian." Following the unveiling of the memorial by Miss Mary Lindsley, a talk was given by Major General Patterson on "The Future of the Dietitian." Miss Mabel T. Boardman followed with an inspirational address on the American Red Cross dietitian and the nutrition service.

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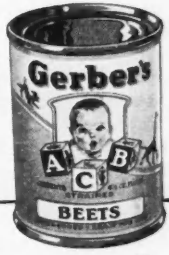

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American Red Cross Nutrition Service. Miss Mabel T. Boardman, National Director, Volunteer Special Services, American Red Cross, in the current issue of the *Red Cross Courier*, offers a graphic presentation of the work of the Red Cross nutritionist in the present emergency. She states that the fact that an Ohio Chapter has placed a volunteer Red Cross nutritionist at work to carry on a service which, because of low financial resources, the Chapter could no longer support on a paid basis, centers attention on the offerings of others enrolled in the Nutrition Service. More than 300 Red Cross dietitians, it is learned, have offered their services as volunteers to help meet the food and nutrition problems of the Chapters. And, without stimulation on the part of the Nutrition Service, 18 young women—home economists trained in food and nutrition—have offered voluntarily to work for Chapters on a full-time basis, asking only maintenance.

From data at National Headquarters she finds that a considerable number of trained home economists qualified to serve as Red Cross nutritionists have in writing stated that, since they are out of employment, they feel they can be of real service to individuals and communities during this period when spending the food dollar well is a perplexing problem. These trained women seek to be used as full-time volunteers in their own Chapters. And some of them have stated they would be willing to serve any Chapter in the country, asking only maintenance while in service, travel pay and cost of uniforms.

In the District of Columbia an enrolled nutritionist has offered her services as a volunteer, and has outlined a program of lectures on food selection and preparation. It is expected that groups of women workers in Government departments will avail themselves of the lecture course. In addition the Chapter is planning organization of nutrition classes in settlements and other welfare institutions. It is probable that volunteers of the Canteen Corps who take the course will serve in the homes of sick mothers to aid in the selection and preparation of suitable food for the family.

The Alabama Dietetic Association was formed in January, according to a letter from Juliette S. Hamilton, by twenty-four representatives from the different fields of the profession. The association is a part of the Tri-State Association and plans to affiliate with the national organization. The February meeting was held at Montevallo as guests of Miss Edwards and Alabama College.

The Chicago Dietetic Association members were the guests of Cutney & Company and Mr. Shircliffe at the Belden Strafford Hotel in December. Cutney & Company used one of the prize steers of the International Live Stock Show for a meat cutting demonstration. After the demonstration Mr. Shircliffe gave an interesting discussion of the cookery of the cheaper cuts of meat. Refreshments were served by Cutney & Company, assisted by Mr. Shircliffe.

The association has become a member of the Federated Council of Professional and Business Women of Chicago. The Council was organized last spring to assist in the relief work among unemployed business and professional women in Chicago.

Inasmuch as the regional meeting sponsored by the Illinois State Dietetic Association was to be held in January, the members of the Chicago Dietetic Association voted to hold a social meeting in January. A charity card party was held for the benefit of the Federated Council.

The Dietetic Section of the North West Hospital Association met on January 18 at the University Women's Club of Seattle. Ailien Johnson, assistant-secretary of the Community Fund, gave a talk on the methods being used to feed the large number of unemployed in Seatle. Through the coöperation of the University of Washington Home Economics Department, this service has been greatly improved by use of better adjusted dietary budgets and better choice of menus. About fifteen members and guests from Seattle, Tacoma and Everett were present. Luncheon was served at the club. Afterward the members attended the joint session held at Harborview Auditorium. Among other pa-

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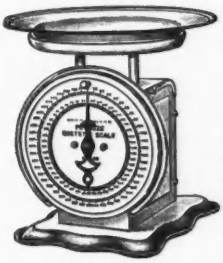

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pers presented was one by Mary Northrup, director of dietetics and housekeeping at the Harborview Hospital, on the "Administrative Aspect of the Dietitian." A round table discussion completed the afternoon session. The evening and dinner session was held at the Olympic Hotel. Dr. H. J. Whitacre, president of Washington State Medical Society was the guest speaker. He spoke on "Economy of Illness."

The District of Columbia Dietetic Association held its October dinner meeting at the Dodge Hotel. It was a joint meeting with the Nutrition Section of the District Home Economics Association. Dr. Lydia Roberts of the University of Chicago was the guest speaker, and discussed phases of the organization of the outline of study in nutrition as offered by the University. Clyde Schuman of the American Red Cross, who represented the District of Columbia Dietetic Association at the Affiliation Luncheon in Cincinnati, made a report at an Executive Committee meeting in November. The annual benefit card party was held at the Dodge Hotel in November. Elsie Fitzgerald had charge of arrangements.

Wells A. Sherman, Head of the Fruits and Vegetable Department of the Bureau of Agriculture, delivered an address on marketing at the January meeting.

Dr. Edith Allen and Mrs. Martha Mumford have renewed their memberships. The following are new members of the association: Josephine Doyle, Providence Hospital; Miss Miller, Walter Reed Hospital; Miss De Weese, Government Cafeterias; Miss Bradley, Catholic Associated Charities; and Mrs. Martha Howe of Takoma Park Sanitarium.

The Hudson Valley Dietitians' Association held its January meeting at the Albany Hospital, Albany, N. Y., on January 8th. Dr. Knudeson, Professor of Chemistry at Albany Medical College, gave an illustrated lecture on "The Treatment of Rickets by Diet." The officers for 1932 are: President, Miss Ray, Albany Hospital; Vice President, Miss McGinnis, Ellis Hospital, Schenectady, N. Y., Treasurer, Miss Deal, Samaritan Hospital, Troy, N. Y.; and Secretary, Miss Marsh, Memorial Hospital, Albany.

The Illinois State Dietetic Association sponsored the Mid-west Regional Meeting in Chicago on January 29th and 30th. On Friday morning trips were made to markets, schools and hospitals. Millie E. Kalsem presided at the afternoon meeting, when papers were read by Dr. A. W. Bitting and Dr. Walter G. Eddy. The annual dinner entertained as guests of honor Dr. Solomon Strouse, Martha Koehne, Frances Swain, Fannie M. Brooks, Dr. Bert Caldwell, and the 1931 speakers of the Chicago Dietetic Association. Dr. A. J. Carlson of the University of Chicago read a paper on "Thirst."

Sarah Elkin presided at the Saturday morning meeting, at which papers were read by Dr. Max Cutler of Michael Reese Hospital and Dr. William C. Rose of the University of Illinois. At the luncheon meeting Helen Bennet spoke on "Building a World's Fair." Evelyn Smith was in charge of Saturday afternoon's session. Lydia J. Roberts spoke on "A Major in Foods and Nutrition," and Aubyn Chinn on "Teaching Nutrition in Public Schools." Reports of the Education and Social Service Sections were made at this time.

The meeting closed with a tea at the Belden Stratford Hotel.

The Iowa State Dietetic Association met in Des Moines, November 13, for its fall meeting. A business meeting was held in the morning and a report of the American Dietetic Association meeting in Cincinnati was given. Frances Swain, representing the Home Economics Association, spoke at the luncheon. The afternoon was given over to papers and a trip through the kitchen of the Younker Brothers Tea Room. Those who presented papers at the afternoon meeting were: Dr. J. T. Strawn, Dietetic Treatment of Peptic Ulcer; Dr. C. H. Sprague, Recent Ideas in Nutrition; Dr. Eli Grimes, Iodine Deficiency; and Miss Mirian Lowenberg, Food Preparation for the Small

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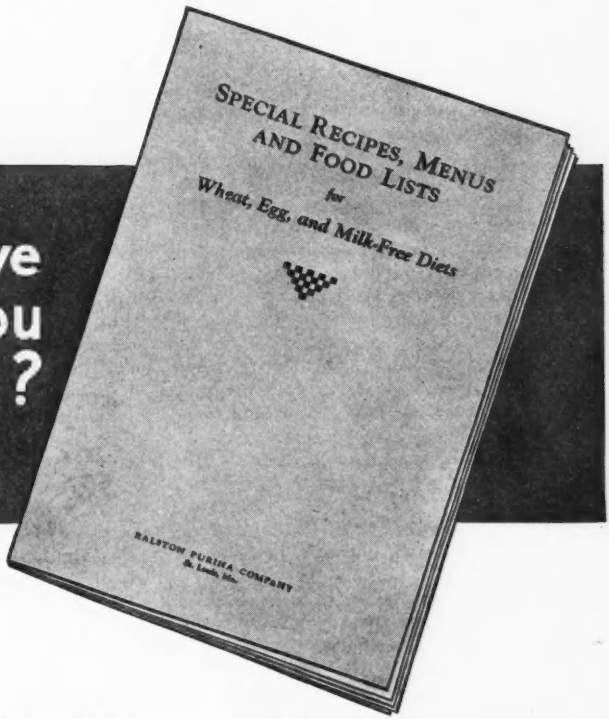

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Child. At the dinner held in Younker's Tea Room, favors used on the trays by various hospitals were displayed.

The Massachusetts Dietetic Association. The December meeting was under the auspices of the student dietitians of the Boston hospitals, with Alice Carslake, Massachusetts General Hospital, as director. At the January meeting, Dr. John Lovett Morse, Professor Emeritus of Pediatrics, Harvard Medical School, spoke on "Food for the Infant and Young Child." A large group of the members enjoyed a trip to the plant and farms of the H. P. Hood Mills Company.

The February meeting comprised a discussion of "Administrative Procedures." In March, Dr. Reginald Fitz, Visiting Physician, Peter Bent Brigham Hospital, will speak on "The Changing Problems of Dietetics."

Among the members recently welcomed into the association are the following: Elizabeth Johnson, St. Luke's Hospital, New Bedford; Rose T. Baker, director, Philip Andover Commons; Mabel Stimpson, Boston Dispensary; Constance Almy, Beth Israel Hospital, Boston; Bernice Levine, Beth Israel Hospital, Boston; Jean Hood, Truesdale Hospital, Fall River; Beth Burgy, Massachusetts Eye and Ear Infirmary, Boston; Irene Gosline, Children's Hospital, Boston; Winifred Mell, Whidden Memorial Hospital, Everett; and Marion Woolworth, Children's Hospital, Boston.

The Minnesota Dietetic Association. Dr. B. A. Watson of the Health Service Staff, University Hospital, was the guest speaker at the November meeting of the association. His subject was "High Carbohydrate Diets in Diabetes." He cited several interesting cases where a high carbohydrate diet brought excellent results. He also displayed and explained tables of substitutions, and showed blocks of wood used for measuring various foods that are given to the patient to simplify the planning of the diet. Gertrude Thomas reported on the affiliation meeting and the 1931 convention. Ethel Gough told of her visit to Michael Reese and Johns Hopkins Hospitals while en route to the convention.

In December the association met at the University of Minnesota Farm Campus. Wylle B. McNeal, Chief of the Division of Home Economics, spoke on "Improved Technique for Recommending Dietitians." She used, as a basis for the subject, the efficiency reports used by the College of Home Economics for grading the work of each student in every Home Economics course taken during the four years. Alice M. Child, Associate Professor of Home Economics, spoke on "Recent Work on Meat Preparation." Following these discussions, the association was entertained at a tea as guests of the faculty of the institution management and nutrition sections of the Home Economics College.

The first social meeting of this year was held in January at Glen Lake Sanitorium when Lucile Townsend and Mrs. Lyl Borak were hostesses at a delightful supper and bridge. The association has recently elected several active members, namely: Myrtle Larson, St. Andrew's Hospital, Minneapolis; Minerva Worthman, Fairview Hospital, Minneapolis; Frances Schweiger, St. Luke's Hospital, St. Paul; Gulielma Fisher, St. Barnabas Hospital, Minneapolis; and Zulu Williams, St. Mary's Hospital, Rochester. Associate members are: Jeanette Owens, Minneapolis; Margaret Rosenmeier, Little Falls; and Matyll Bender, St. Mary's Hospital, Rochester.

The Nebraska Dietetic Association has elected the following officers for the coming year: President, Mrs. A. K. Bettinger; Vice President, Marie Courtright; Treasurer, Mrs. Ruth Quisenberry; and Secretary, Martha Nesladek. In December an attractive Christmas party with a full attendance was held at the home of Mrs. Bettinger.

Angeline Phillips is now at University Hospital in Omaha. She was formerly a dietitian at the Fifth Avenue Hospital, New York City. Mary Hartquist, who was formerly at the Mayo Clinic, is now at Clarkson. Mrs. Methias, formerly of Min-

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neapolis, has become a member of the association.

The Greater New York Dietetic Association held its January meeting at the Russell Sage Foundation. Dr. Beatrice Kestin of Columbia University spoke on "Food Allergy." Gertrude R. Stein of the Vocational Service Bureau spoke on "New Jobs for Home Economics People." The acceptance of the American Dietetic Association to hold its annual meeting in New York in 1932 was presented.

A joint meeting of the Greater New York Dietetic Association and First and Ninth District Dental Societies was held on February 10, 1932, at the Academy of Medicine. The speaker was Dr. Russell W. Bunting of the University of Michigan, who discussed "Present Trends in the Study of Dental Caries." The discussion was led by Dr. Walter H. Eddy of Columbia University, Dr. Martin Dewey, President of the American Dental Association, and Dr. Alfred Walker of the College of Dentistry, New York University.

A dinner at the Academy of Medicine for Dr. Bunting and officers and other members of the various associations preceded the meeting.

Ontario Dietetic Association. The November meeting in the Lecture Hall of the Department of Household Science, University of Toronto, was devoted to reports of the Cincinnati convention, given by Alice Pidgeon, the delegate, and others who were present. At the December meeting, Ruth M. Home, M. A., lecturer at the Royal Ontario Museum, traced the history of cooking, from prehistoric times, through the Egyptian, Greek, and Roman Empires.

Plans are under way for an all-day meeting early in April, in Toronto, and much effort is being expended in order to make this meeting a success. It is expected many dietitians from all over the Province will be present.

Lorna Faulds and Doreen Smith received Master of Arts Degrees from the University of Toronto in 1931. Mrs. W. W. Abernethy (Marjorie Kiteley) has announced the birth of a son. Patricia Navin has joined the dietetic staff of St. Michael's Hospital, Toronto.

The Philadelphia Dietetic Association. Helen E. Gilson, director of the dietary department of the Pennsylvania Hospital, sends an interesting report of the activities of the association, and mentions having used to advantage the charts and technique books of the University of Michigan Hospital at a recent meeting. Copies of the JOURNAL, Placement Bureau forms, application blanks, etc., offered an opportunity for new members to become acquainted with the work of the national Association. Speakers were kept to their allotted five minutes, the general subject of the meeting being "Illustrative Material for Teaching Nutrition to Professional and Community Groups." Among the speakers were Dr. Hanke, Emma S. Feagles, Mrs. Anna DePlanter Bowes, Dr. Hannah Lyons, Frances Wiley, Mary Brown, Emma Smedley, Florence Lee, Elizabeth Miller, Neva Belz, Isabel Roberts, Laura M. Bingham and Ruth V. Gorham. The meeting was held at the Launkenau Hospital with Sister Emma Tappert as hostess and Ruth V. Gorham, leader.

The Tri-State Dietetic Association held its third annual meeting at Chattanooga, Tennessee, on February 13, with Fairfax Proudfit, President, presiding at the business meeting and the dinner. Mrs. Lawrence Faucett spoke on "Food Customs of the Chinese" at the luncheon over which Edith Hunt presided. E. Ferris Schmid was in charge of the afternoon session, when Dr. Lillian B. Storms gave an address on "The Dietitian in the Commercial Field," followed by Dr. James L. Bibb's paper, "Nervous Indigestion," and an address by Dr. Fred E. Marsh on "Sprue." The members of the Association were the guests of Kosmos-Woman's Club for tea. Following the President's address at the dinner meeting, Dr. Florence MacLeod spoke on "Recent Advances in Nutrition," and Dr. G. A. Wheeler spoke on "Pellagra."

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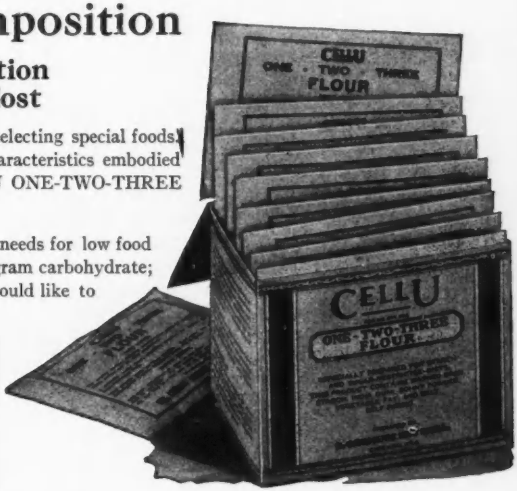

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The Virginia State Dietetic Association held its semi-annual meeting in Richmond, in November, immediately following the national convention in Cincinnati. Being an affiliated association, motions for reorganization along sectional activities and changing of the fiscal year to coincide with that of the national association were adopted at this time. The business meeting was held in the auditorium of the Stuart Circle new nurses' home, and was followed by a dinner meeting at the Jefferson Hotel. Dean Rudd of the Medical College of Virginia, Department of Chemistry, made the address and urged dietitians to do more research work. He felt that they have a vast opportunity to promote progress in the field of nutrition and believed that they do not, as a class, avail themselves of the opportunity which is theirs. He maintained that they tend to devote themselves to the administrative and therapeutic phases and neglect the ever important work of research.

Helen Roll, state president, Bertha Ide, past president, Aileen Brown, vice president, and Kathryn Heitshu of the Medical College of Virginia attended the convention in Cincinnati.

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The Western Washington State Dietetic Association met January 22 at the Gowman Hotel in Seattle. Mabel Flanley who has recently returned from Australia, spoke of her work as a pioneer in dietetics at the Alfred Hospital in Melbourne. While there she trained eight student dietitians, who are now holding positions in the Alfred and other hospitals in Australia. There were twenty-four dietitians present at the meeting. The program committee reported plans for the coming meetings.

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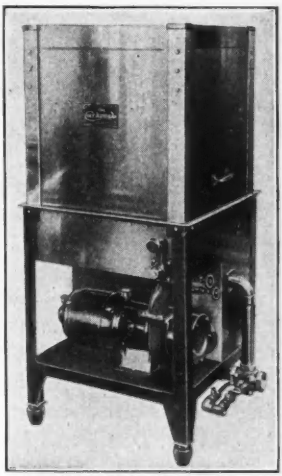

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WHO'S WHO IN THIS ISSUE

MARTHA KOEHNE, Ph.D., the President of the American Dietetic Association, was listed among the contributors in the September, 1931, JOURNAL.

A. C. BACHMEYER, M.D., has served as Superintendent of the Cincinnati General Hospital and the Hamilton County Tuberculosis Sanatorium since 1914 and as Dean of the College of Medicine of the University of Cincinnati since 1925. He was President of the American Hospital Association in 1925–26 and of the American Conference on Hospital Service in 1926–27. Dr. Bachmeyer served as consultant in several instances pertaining both to problems of administration and construction and participated in the studies made in Washington, D. C., and Kansas City, Missouri, by the American Public Health Association.

SAMUEL J. FOGELSON, M.D., received his education at the University of Chicago, Rush Medical College, and Northwestern University. He was exchange resident with Professor Hans Finster of Vienna, Austria, in 1924, and with Professor Frederick von Haberer of the University of Graz, Austria, the following year. At present he is instructor in Experimental Surgery at Northwestern University Medical School and is a member of the Staff of Wesley Memorial Hospital and Passavant Hospital, Chicago.

DR. MARY S. ROSE, Professor of Nutrition, Teachers College, Columbia University, needs little introduction to our readers. Her books, "Feeding the Family," "The Laboratory Handbook for Dietetics" and "The Foundations of Nutrition" are among the most widely known and quoted reference books on the subject of nutrition. Dr. Grace MacLeod is Professor of Nutrition, Teachers College. She is especially interested in problems of energy metabolism and is using the new respiration chamber of the department for research on the energy metabolism of children. Dr. Ella McCollum Vahlteich, for the past seven years, has been Research Associate in Nutrition at Teachers College. Mrs. Vahlteich completed the work for her Doctor's degree in June, 1931. Her dissertation is entitled "A Quantitative Study of the Influence of Nutrients on Hemoglobin Regeneration." Esther Funnell is Research Assistant in Nutrition at Teachers College and holds a Bachelor's degree from Cornell University and a master's degree from Columbia. During the Summer Session she assisted in the Department of Household Chemistry, Teachers College.

JEAN E. HAWKS was a contributor to the December JOURNAL in which the first section of her paper appeared.

ALMA E. BERING received her degree from the University of Nebraska, followed by post-graduate work at the University of Nebraska and Teachers

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College, Columbia University. She received her student training at Presbyterian Hospital, New York City, under Dr. Mary DeGarmo Bryan and Dr. Kate Daum. Miss Bering is now chief dietitian at the Sheppard and Enoch Pratt Hospital, Towson, Maryland, where she has served for eight years.

DR. ADA HART ARLITT is Professor and Head of the Department of Child Care and Training at the University of Cincinnati and Director of the Mothers' Training Center Association of that City. She is National Chairman of Parent Education for the National Congress of Parents and Teachers, a member of the Governing Board of the National Council of Parent Education, and Chairman of the Committee on Fellowships and Scholarships for that organization. Dr. Arlitt is Associate Editor of *Child Welfare Magazine* and the author of "The Psychology of Infancy and Early Childhood," "The Child from One to Twelve," and numerous scientific and semipopular articles.

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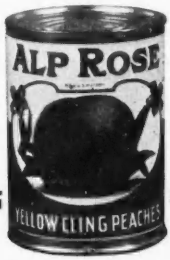

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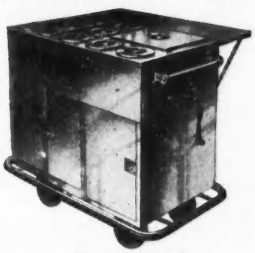

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